

WHAT IS CLAIMED IS:

1. A composition, comprising:

a human interleukin-3 mutant polypeptide of the

5 Formula:

	Ala	Pro	Met	Thr	Gln	Thr	Thr	Ser	Leu	Lys	Thr	Ser	Trp	Val	Asn	
	1				5					10					15	
10	Cys	Xaa	Xaa	Xaa	Xaa	Xaa	Xaa	Xaa	Xaa	Xaa	Xaa	Xaa	Xaa	Xaa	Xaa	
					20					25					30	
	Xaa	Xaa	Xaa	Xaa	Xaa	Xaa	Xaa	Asn	Xaa	Xaa	Xaa	Xaa	Xaa	Xaa	Xaa	
					35					40					45	
15	Xaa	Xaa	Xaa	Xaa	Xaa	Xaa	Xaa	Xaa	Xaa	Xaa	Xaa	Xaa	Xaa	Xaa	Xaa	
					50					55					60	
	Xaa	Xaa	Xaa	Xaa	Xaa	Xaa	Xaa	Xaa	Xaa	Xaa	Xaa	Xaa	Xaa	Xaa	Xaa	
20					65					70					75	
	Xaa	Xaa	Xaa	Xaa	Xaa	Xaa	Xaa	Xaa	Xaa	Xaa	Xaa	Xaa	Xaa	Xaa	Xaa	
					80					85					90	
25	Xaa	Xaa	Xaa	Xaa	Xaa	Xaa	Xaa	Xaa	Xaa	Xaa	Xaa	Xaa	Xaa	Xaa	Xaa	
					95					100					105	
	Xaa	Phe	Xaa	Xaa	Xaa	Xaa	Xaa	Xaa	Xaa	Xaa	Xaa	Xaa	Xaa	Xaa	Xaa	
					110					115					120	
30	Xaa	Xaa	Xaa	Gln	Gln	Thr	Thr	Leu	Ser	Leu	Ala	Ile	Phe			
					125					130						

[SEQ ID NO:1]

35 wherein

Xaa at position 17 is Ser, Lys, Gly, Asp, Met, Gln, or

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Arg;
Xaa at position 18 is Asn, His, Leu, Ile, Phe, Arg, or
Gln;
Xaa at position 19 is Met, Phe, Ile, Arg, Gly, Ala, or
5 Cys;
Xaa at position 20 is Ile, Cys, Gln, Glu, Arg, Pro, or
Ala;
Xaa at position 21 is Asp, Phe, Lys, Arg, Ala, Gly, Glu,
Gln, Asn, Thr, Ser or Val;
10 Xaa at position 22 is Glu, Trp, Pro, Ser, Ala, His, Asp,
Asn, Gln, Leu, Val or Gly;
Xaa at position 23 is Ile, Val, Ala, Leu, Gly, Trp, Lys,
Phe, Leu, Ser, or Arg;
Xaa at position 24 is Ile, Gly, Val, Arg, Ser, Phe, or
15 Leu;
Xaa at position 25 is Thr, His, Gly, Gln, Arg, Pro, or
Ala;
Xaa at position 26 is His, Thr, Phe, Gly, Arg, Ala, or
Trp;
20 Xaa at position 27 is Leu, Gly, Arg, Thr, Ser, or Ala;
Xaa at position 28 is Lys, Arg, Leu, Gln, Gly, Pro, Val or
Trp;
Xaa at position 29 is Gln, Asn, Leu, Pro, Arg, or Val;
Xaa at position 30 is Pro, His, Thr, Gly, Asp, Gln, Ser,
25 Leu, or Lys;
Xaa at position 31 is Pro, Asp, Gly, Ala, Arg, Leu, or
Gln;
Xaa at position 32 is Leu, Val, Arg, Gln, Asn, Gly, Ala,
or Glu;
30 Xaa at position 33 is Pro, Leu, Gln, Ala, Thr, or Glu;
Xaa at position 34 is Leu, Val, Gly, Ser, Lys, Glu, Gln,
Thr, Arg, Ala, Phe, Ile or Met;
Xaa at position 35 is Leu, Ala, Gly, Asn, Pro, Gln, or
Val;
35 Xaa at position 36 is Asp, Leu, or Val;
Xaa at position 37 is Phe, Ser, Pro, Trp, or Ile;

- Xaa at position 38 is Asn, or Ala;
Xaa at position 40 is Leu, Trp, or Arg;
Xaa at position 41 is Asn, Cys, Arg, Leu, His, Met, or
Pro;
- 5 Xaa at position 42 is Gly, Asp, Ser, Cys, Asn, Lys, Thr,
Leu, Val, Glu, Phe, Tyr, Ile, Met or Ala;
Xaa at position 43 is Glu, Asn, Tyr, Leu, Phe, Asp, Ala,
Cys, Gln, Arg, Thr, Gly or Ser;
Xaa at position 44 is Asp, Ser, Leu, Arg, Lys, Thr, Met,
10 Trp, Glu, Asn, Gln, Ala or Pro;
Xaa at position 45 is Gln, Pro, Phe, Val, Met, Leu, Thr,
Lys, Trp, Asp, Asn, Arg, Ser, Ala, Ile, Glu or His;
Xaa at position 46 is Asp, Phe, Ser, Thr, Cys, Glu, Asn,
Gln, Lys, His, Ala, Tyr, Ile, Val or Gly;
- 15 Xaa at position 47 is Ile, Gly, Val, Ser, Arg, Pro, or
His;
Xaa at position 48 is Leu, Ser, Cys, Arg, Ile, His, Phe,
Glu, Lys, Thr, Ala, Met, Val or Asn;
Xaa at position 49 is Met, Arg, Ala, Gly, Pro, Asn, His,
20 or Asp;
Xaa at position 50 is Glu, Leu, Thr, Asp, Tyr, Lys, Asn,
Ser, Ala, Ile, Val, His, Phe, Met or Gln;
Xaa at position 51 is Asn, Arg, Met, Pro, Ser, Thr, or
His;
- 25 Xaa at position 52 is Asn, His, Arg, Leu, Gly, Ser, or
Thr;
Xaa at position 53 is Leu, Thr, Ala, Gly, Glu, Pro, Lys,
Ser, or Met;
Xaa at position 54 is Arg, Asp, Ile, Ser, Val, Thr, Gln,
30 Asn, Lys, His, Ala or Leu;
Xaa at position 55 is Arg, Thr, Val, Ser, Leu, or Gly;
Xaa at position 56 is Pro, Gly, Cys, Ser, Gln, Glu, Arg,
His, Thr, Ala, Tyr, Phe, Leu, Val or Lys;
Xaa at position 57 is Asn or Gly;
- 35 Xaa at position 58 is Leu, Ser, Asp, Arg, Gln, Val, or
Cys;

- Xaa at position 59 is Glu Tyr, His, Leu, Pro, or Arg;
Xaa at position 60 is Ala, Ser, Pro, Tyr, Asn, or Thr;
Xaa at position 61 is Phe, Asn, Glu, Pro, Lys, Arg, or
Ser;
- 5 Xaa at position 62 is Asn His, Val, Arg, Pro, Thr, Asp, or
Ile;
- Xaa at position 63 is Arg, Tyr, Trp, Lys, Ser, His, Pro,
or Val;
- Xaa at position 64 is Ala, Asn, Pro, Ser, or Lys;
- 10 Xaa at position 65 is Val, Thr, Pro, His, Leu, Phe, or
Ser;
- Xaa at position 66 is Lys, Ile, Arg, Val, Asn, Glu, or
Ser;
- Xaa at position 67 is Ser, Ala, Phe, Val, Gly, Asn, Ile,
15 Pro, or His;
- Xaa at position 68 is Leu, Val, Trp, Ser, Ile, Phe, Thr,
or His;
- Xaa at position 69 is Gln, Ala, Pro, Thr, Glu, Arg, Trp,
Gly, or Leu;
- 20 Xaa at position 70 is Asn, Leu, Val, Trp, Pro, or Ala;
Xaa at position 71 is Ala, Met, Leu, Pro, Arg, Glu, Thr,
Gln, Trp, or Asn;
- Xaa at position 72 is Ser, Glu, Met, Ala, His, Asn, Arg,
or Asp;
- 25 Xaa at position 73 is Ala, Glu, Asp, Leu, Ser, Gly, Thr,
or Arg;
- Xaa at position 74 is Ile, Met, Thr, Pro, Arg, Gly, Ala;
Xaa at position 75 is Glu, Lys, Gly, Asp, Pro, Trp, Arg,
Ser, Gln, or Leu;
- 30 Xaa at position 76 is Ser, Val, Ala, Asn, Trp, Glu, Pro,
Gly, or Asp;
- Xaa at position 77 is Ile, Ser, Arg, Thr, or Leu;
Xaa at position 78 is Leu, Ala, Ser, Glu, Phe, Gly, or
Arg;
- 35 Xaa at position 79 is Lys, Thr, Asn, Met, Arg, Ile, Gly,
or Asp;

- Xaa at position 80 is Asn, Trp, Val, Gly, Thr, Leu, Glu,
or Arg;
- Xaa at position 81 is Leu, Gln, Gly, Ala, Trp, Arg, Val,
or Lys;
- 5 Xaa at position 82 is Leu, Gln, Lys, Trp, Arg, Asp, Glu,
Asn, His, Thr, Ser, Ala, Tyr, Phe, Ile, Met or Val;
- Xaa at position 83 is Pro, Ala, Thr, Trp, Arg, or Met;
- Xaa at position 84 is Cys, Glu, Gly, Arg, Met, or Val;
- Xaa at position 85 is Leu, Asn, Val, or Gln;
- 10 Xaa at position 86 is Pro, Cys, Arg, Ala, or Lys;
- Xaa at position 87 is Leu, Ser, Trp, or Gly;
- Xaa at position 88 is Ala, Lys, Arg, Val, or Trp;
- Xaa at position 89 is Thr, Asp, Cys, Leu, Val, Glu, His,
Asn, or Ser;
- 15 Xaa at position 90 is Ala, Pro, Ser, Thr, Gly, Asp, Ile,
or Met;
- Xaa at position 91 is Ala, Pro, Ser, Thr, Phe, Leu, Asp,
or His;
- Xaa at position 92 is Pro, Phe, Arg, Ser, Lys, His, Ala,
20 Gly, Ile or Leu;
- Xaa at position 93 is Thr, Asp, Ser, Asn, Pro, Ala, Leu,
or Arg;
- Xaa at position 94 is Arg, Ile, Ser, Glu, Leu, Val, Gln,
Lys, His, Ala, or Pro;
- 25 Xaa at position 95 is His, Gln, Pro, Arg, Val, Leu, Gly,
Thr, Asn, Lys, Ser, Ala, Trp, Phe, Ile, or Tyr;
- Xaa at position 96 is Pro, Lys, Tyr, Gly, Ile, or Thr;
- Xaa at position 97 is Ile, Val, Lys, Ala, or Asn;
- Xaa at position 98 is His, Ile, Asn, Leu, Asp, Ala, Thr,
30 Glu, Gln, Ser, Phe, Met, Val, Lys, Arg, Tyr or Pro;
- Xaa at position 99 is Ile, Leu, Arg, Asp, Val, Pro, Gln,
Gly, Ser, Phe, or His;
- Xaa at position 100 is Lys, Tyr, Leu, His, Arg, Ile, Ser,
Gln, or Pro;
- 35 Xaa at position 101 is Asp, Pro, Met, Lys, His, Thr, Val,
Tyr, Glu, Asn, Ser, Ala, Gly, Ile, Leu, or Gln;

- Xaa at position 102 is Gly, Leu, Glu, Lys, Ser, Tyr, or Pro;
- Xaa at position 103 is Asp, or Ser;
- Xaa at position 104 is Trp, Val, Cys, Tyr, Thr, Met, Pro, 5 Leu, Gln, Lys, Ala, Phe, or Gly;
- Xaa at position 105 is Asn, Pro, Ala, Phe, Ser, Trp, Gln, Tyr, Leu, Lys, Ile, Asp, or His;
- Xaa at position 106 is Glu, Ser, Ala, Lys, Thr, Ile, Gly, or Pro;
- 10 Xaa at position 108 is Arg, Lys, Asp, Leu, Thr, Ile, Gln, His, Ser, Ala or Pro;
- Xaa at position 109 is Arg, Thr, Pro, Glu, Tyr, Leu, Ser, or Gly;
- Xaa at position 110 is Lys, Ala, Asn, Thr, Leu, Arg, Gln, 15 His, Glu, Ser, Ala, or Trp;
- Xaa at position 111 is Leu, Ile, Arg, Asp, or Met;
- Xaa at position 112 is Thr, Val, Gln, Tyr, Glu, His, Ser, or Phe;
- Xaa at position 113 is Phe, Ser, Cys, His, Gly, Trp, Tyr, 20 Asp, Lys, Leu, Ile, Val or Asn;
- Xaa at position 114 is Tyr, Cys, His, Ser, Trp, Arg, or Leu;
- Xaa at position 115 is Leu, Asn, Val, Pro, Arg, Ala, His, Thr, Trp, or Met;
- 25 Xaa at position 116 is Lys, Leu, Pro, Thr, Met, Asp, Val, Glu, Arg, Trp, Ser, Asn, His, Ala, Tyr, Phe, Gln, or Ile;
- Xaa at position 117 is Thr, Ser, Asn, Ile, Trp, Lys, or Pro;
- 30 Xaa at position 118 is Leu, Ser, Pro, Ala, Glu, Cys, Asp, or Tyr;
- Xaa at position 119 is Glu, Ser, Lys, Pro, Leu, Thr, Tyr, or Arg;
- Xaa at position 120 is Asn, Ala, Pro, Leu, His, Val, or 35 Gln;
- Xaa at position 121 is Ala, Ser, Ile, Asn, Pro, Lys, Asp,

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or Gly;
 Xaa at position 122 is Gln, Ser, Met, Trp, Arg, Phe, Pro,
 His, Ile, Tyr, or Cys;
 Xaa at position 123 is Ala, Met, Glu, His, Ser, Pro, Tyr,
 5 or Leu;

and which can additionally have Met- preceding the amino
 acid in position 1; and wherein from 1 to 14 amino acids
 can be deleted from the N-terminus and/or from 1 to 15
 10 amino acids can be deleted from the C-terminus; and wherein
 from 4 to 44 of the amino acids designated by Xaa are
 different from the corresponding amino acids of native (1-
 133) human interleukin-3;

15 a colony stimulating factor; and
 at least one non-toxic pharmaceutically acceptable
 carrier.

2. A composition, comprising:
 20 a human interleukin-3 mutant polypeptide of the
 Formula:

Ala	Pro	Met	Thr	Gln	Thr	Thr	Ser	Leu	Lys	Thr	Ser	Trp	Val	Asn
1				5					10					15
Cys	Xaa	Xaa	Xaa	Ile	Xaa	Glu	Xaa	Xaa	Xaa	Xaa	Leu	Lys	Xaa	Xaa
				20					25					30
Xaa	Xaa	Xaa	Xaa	Xaa	Asp	Xaa	Xaa	Asn	Leu	Asn	Xaa	Glu	Xaa	Xaa
				35					40					45
Xaa	Ile	Leu	Met	Xaa	Xaa	Asn	Leu	Xaa	Xaa	Xaa	Asn	Leu	Glu	Xaa
				50					55					60
Phe	Xaa	Xaa	Xaa	Xaa	Xaa	Xaa	Xaa	Xaa	Asn	Xaa	Xaa	Xaa	Ile	Glu
				65					70					75

	Xaa	Xaa	Leu	Xaa	Leu	Xaa	Xaa	Cys	Xaa	Pro	Xaa	Xaa	Thr	Ala
					80					85				90
5	Xaa	Pro	Xaa	Arg	Xaa	Xaa	Xaa	Xaa	Xaa	Xaa	Gly	Asp	Xaa	Xaa
					95					100				105
	Xaa	Phe	Xaa	Xaa	Lys	Leu	Xaa	Phe	Xaa	Xaa	Xaa	Leu	Glu	Xaa
					110					115				120
10														
	Xaa	Xaa	Xaa	Gln	Gln	Thr	Thr	Leu	Ser	Leu	Ala	Ile	Phe	[SEQ ID NO:2]
					125					130				

15 Xaa at position 17 is Ser, Gly, Asp, Met, or Gln;
Xaa at position 18 is Asn, His, or Ile;
Xaa at position 19 is Met or Ile;
Xaa at position 21 is Asp or Glu;
Xaa at position 23 is Ile, Ala, Leu, or Gly;
20 Xaa at position 24 is Ile, Val, or Leu;
Xaa at position 25 is Thr, His, Gln, or Ala;
Xaa at position 26 is His or Ala;
Xaa at position 29 is Gln, Asn, or Val;
Xaa at position 30 is Pro, Gly, or Gln;
25 Xaa at position 31 is Pro, Asp, Gly, or Gln;
Xaa at position 32 is Leu, Arg, Gln, Asn, Gly, Ala, or
Glu;
Xaa at position 33 is Pro or Glu;
Xaa at position 34 is Leu, Val, Gly, Ser, Lys, Ala, Arg,
30 Gln, Glu, Ile, Phe, Thr or Met;
Xaa at position 35 is Leu, Ala, Asn, Pro, Gln, or Val;
Xaa at position 37 is Phe, Ser, Pro, or Trp;
Xaa at position 38 is Asn or Ala;
Xaa at position 42 is Gly, Asp, Ser, Cys, Ala, Asn, Ile,
35 Leu, Met, Tyr or Arg;
Xaa at position 44 is Asp or Glu;

- Xaa at position 45 is Gln, Val, Met, Leu, Thr, Ala, Asn,
Glu, Ser or Lys;
- Xaa at position 46 is Asp, Phe, Ser, Thr, Ala, Asn Gln,
Glu, His, Ile, Lys, Tyr, Val or Cys;
- 5 Xaa at position 50 is Glu, Ala, Asn, Ser or Asp;
Xaa at position 51 is Asn, Arg, Met, Pro, Ser, Thr, or
His;
- Xaa at position 54 is Arg or Ala;
- Xaa at position 55 is Arg, Thr, Val, Leu, or Gly;
- 10 Xaa at position 56 is Pro, Gly, Ser, Gln, Ala, Arg, Asn,
Glu, Leu, Thr, Val or Lys;
- Xaa at position 60 is Ala or Ser;
- Xaa at position 62 is Asn, Pro, Thr, or Ile;
- Xaa at position 63 is Arg or Lys;
- 15 Xaa at position 64 is Ala or Asn;
- Xaa at position 65 is Val or Thr;
- Xaa at position 66 is Lys or Arg;
- Xaa at position 67 is Ser, Phe, or His;
- Xaa at position 68 is Leu, Ile, Phe, or His;
- 20 Xaa at position 69 is Gln, Ala, Pro, Thr, Glu, Arg, or
Gly;
- Xaa at position 71 is Ala, Pro, or Arg;
- Xaa at position 72 is Ser, Glu, Arg, or Asp;
- Xaa at position 73 is Ala or Leu;
- 25 Xaa at position 76 is Ser, Val, Ala, Asn, Glu, Pro, or
Gly;
- Xaa at position 77 is Ile or Leu;
- Xaa at position 79 is Lys, Thr, Gly, Asn, Met, Arg, Ile,
Gly, or Asp;
- 30 Xaa at position 80 is Asn, Gly, Glu, or Arg;
- Xaa at position 82 is Leu, Gln, Trp, Arg, Asp, Ala, Asn,
Glu, His, Ile, Met, Phe, Ser, Thr, Tyr or Val;
- Xaa at position 83 is Pro or Thr;
- Xaa at position 85 is Leu or Val;
- 35 Xaa at position 87 is Leu or Ser;
- Xaa at position 88 is Ala or Trp;

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- Xaa at position 91 is Ala or Pro;
Xaa at position 93 is Thr, Asp, Ser, Pro, Ala, Leu, or
Arg;
Xaa at position 95 is His, Pro, Arg, Val, Leu, Gly, Asn,
5 Phe, Ser or Thr;
Xaa at position 96 is Pro or Tyr;
Xaa at position 97 is Ile or Val;
Xaa at position 98 is His, Ile, Asn, Leu, Ala, Thr, Leu,
Arg, Gln, Leu, Lys, Met, Ser, Tyr, Val or Pro;
10 Xaa at position 99 is Ile, Leu, or Val;
Xaa at position 100 is Lys, Arg, Ile, Gln, Pro, or Ser;
Xaa at position 101 is Asp, Pro, Met, Lys, His, Thr, Pro,
Asn, Ile, Leu or Tyr;
Xaa at position 104 is Trp or Leu;
15 Xaa at position 105 is Asn, Pro, Ala, Ser, Trp, Gln, Tyr,
Leu, Lys, Ile, Asp, or His;
Xaa at position 106 is Glu or Gly;
Xaa at position 108 is Arg, Ala, or Ser;
Xaa at position 109 is Arg, Thr, Glu, Leu, or Ser;
20 Xaa at position 112 is Thr, Val, or Gln;
Xaa at position 114 is Tyr or Trp;
Xaa at position 115 is Leu or Ala;
Xaa at position 116 is Lys, Thr, Val, Trp, Ser, Ala, His,
Met, Phe, Tyr or Ile;
25 Xaa at position 117 is Thr or Ser;
Xaa at position 120 is Asn, Pro, Leu, His, Val, or Gln;
Xaa at position 121 is Ala, Ser, Ile, Asn, Pro, Asp, or
Gly;
Xaa at position 122 is Gln, Ser, Met, Trp, Arg, Phe, Pro,
30 His, Ile, Tyr, or Cys;
Xaa at position 123 is Ala, Met, Glu, His, Ser, Pro, Tyr,
or Leu;
- and which can additionally have Met- preceding the amino
35 acid in position 1; and wherein from 1 to 14 amino acids
can be deleted from the N-terminus and/or from 1 to 15

amino acids can be deleted from the C-terminus; and wherein from 4 to 35 of the amino acids designated by Xaa are different from the corresponding amino acids of native (1-133)human interleukin-3;

5 a colony stimulating factor selected from the group consisting of GM-CSF, CSF-1, G-CSF, Meg-CSF (more recently referred to as c-mpl ligand), M-CSF, erythropoietin (EPO), IL-1, IL-4, IL-2, IL-5, IL-6, IL-7, IL-8, IL-9, IL-10, IL-11, IL-12, IL-13, LIF, flt3/flk2, human growth hormone, B-
10 cell growth factor, B-cell differentiation factor, eosinophil differentiation factor and stem cell factor (SCF); and

at least one non-toxic pharmaceutically acceptable carrier.

15

3. A composition of claim 2, wherein said human interleukin-3 mutant polypeptide is of the Formula:

20	Ala	Pro	Met	Thr	Gln	Thr	Thr	Ser	Leu	Lys	Thr	Ser	Trp	Val	Asn
	1				5					10					15
	Cys	Xaa	Xaa	Met	Ile	Asp	Glu	Xaa	Ile	Xaa	Xaa	Leu	Lys	Xaa	Xaa
					20					25					30
25	Pro	Xaa	Pro	Xaa	Xaa	Asp	Phe	Xaa	Asn	Leu	Asn	Xaa	Glu	Asp	Xaa
					35					40					45
	Xaa	Ile	Leu	Met	Xaa	Xaa	Asn	Leu	Arg	Xaa	Xaa	Asn	Leu	Glu	Ala
					50					55					60
30	Phe	Xaa	Arg	Xaa	Xaa	Lys	Xaa	Xaa	Xaa	Asn	Ala	Ser	Ala	Ile	Glu
					65					70					75
	Xaa	Xaa	Leu	Xaa	Xaa	Leu	Xaa	Pro	Cys	Leu	Pro	Xaa	Xaa	Thr	Ala
35					80					85					90

	Xaa	Pro	Xaa	Arg	Xaa	Pro	Ile	Xaa	Xaa	Xaa	Gly	Asp	Trp	Xaa	
					95						100				105
	Glu	Phe	Xaa	Xaa	Lys	Leu	Xaa	Phe	Tyr	Leu	Xaa	Xaa	Leu	Glu	Xaa
5					110					115					120
	Xaa	Xaa	Xaa	Gln	Gln	Thr	Thr	Leu	Ser	Leu	Ala	Ile	Phe		
					125					130					
	[SEQ ID NO:3]														
10	wherein														
	Xaa at position 17 is Ser, Gly, Asp, or Gln;														
	Xaa at position 18 is Asn, His, or Ile;														
	Xaa at position 23 is Ile, Ala, Leu, or Gly;														
15	Xaa at position 25 is Thr, His, or Gln;														
	Xaa at position 26 is His or Ala;														
	Xaa at position 29 is Gln or Asn;														
	Xaa at position 30 is Pro or Gly;														
	Xaa at position 32 is Leu, Arg, Asn, or Ala;														
20	Xaa at position 34 is Leu, Val, Ser, Ala, Arg, Gln, Glu,														
	Ile, Phe, Thr, or Met;														
	Xaa at position 35 is Leu, Ala, Asn, or Pro;														
	Xaa at position 38 is Asn or Ala;														
	Xaa at position 42 is Gly, Asp, Ser, Ala, Asn, Ile, Leu,														
25	Met, Tyr or Arg;														
	Xaa at position 45 is Gln, Val, Met, Leu, Ala, Asn, Glu,														
	or Lys;														
	Xaa at position 46 is Asp, Phe, Ser, Gln, Glu, His, Val														
	or Thr;														
30	Xaa at position 50 is Glu Asn, Ser or Asp;														
	Xaa at position 51 is Asn, Arg, Pro, Thr, or His;														
	Xaa at position 55 is Arg, Leu, or Gly;														
	Xaa at position 56 is Pro, Gly, Ser, Ala, Asn, Val, Leu or														
	Gln;														
35	Xaa at position 62 is Asn, Pro, or Thr;														
	Xaa at position 64 is Ala or Asn;														

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- Xaa at position 65 is Val or Thr;
Xaa at position 67 is Ser or Phe;
Xaa at position 68 is Leu or Phe;
Xaa at position 69 is Gln, Ala, Glu, or Arg;
5 Xaa at position 76 is Ser, Val, Asn, Pro, or Gly;
Xaa at position 77 is Ile or Leu;
Xaa at position 79 is Lys, Gly, Asn, Met, Arg, Ile, or
Gly;
Xaa at position 80 is Asn, Gly, Glu, or Arg;
10 Xaa at position 82 is Leu, Gln, Trp, Arg, Asp, Asn, Glu,
His, Met, Phe, Ser, Thr, Tyr or Val;
Xaa at position 87 is Leu or Ser;
Xaa at position 88 is Ala or Trp;
Xaa at position 91 is Ala or Pro;
15 Xaa at position 93 is Thr, Asp, or Ala;
Xaa at position 95 is His, Pro, Arg, Val, Gly, Asn, Ser or
Thr;
Xaa at position 98 is His, Ile, Asn, Ala, Thr, Gln, Glu,
Lys, Met, Ser, Tyr, Val or Leu;
20 Xaa at position 99 is Ile or Leu;
Xaa at position 100 is Lys or Arg;
Xaa at position 101 is Asp, Pro, Met, Lys, Thr, His, Pro,
Asn, Ile, Leu or Tyr;
Xaa at position 105 is Asn, Pro, Ser, Ile or Asp;
25 Xaa at position 108 is Arg, Ala, or Ser;
Xaa at position 109 is Arg, Thr, Glu, Leu, or Ser;
Xaa at position 112 is Thr or Gln;
Xaa at position 116 is Lys, Val, Trp, Ala, His, Phe, Tyr
or Ile;
30 Xaa at position 117 is Thr or Ser;
Xaa at position 120 is Asn, Pro, Leu, His, Val, or Gln;
Xaa at position 121 is Ala, Ser, Ile, Pro, or Asp;
Xaa at position 122 is Gln, Met, Trp, Phe, Pro, His, Ile,
or Tyr;
35 Xaa at position 123 is Ala, Met, Glu, Ser, or Leu;

and which can additionally have Met- preceding the amino acid in position 1; and wherein from 1 to 14 amino acids can be deleted from the N-terminus and/or from 1 to 15 amino acids can be deleted from the C-terminus; and wherein
5 from 4 to 44 of the amino acids designated by Xaa are different from the corresponding amino acids of native (1-133)human interleukin-3.

4. A composition of claim 3, wherein said human
10 interleukin-3 mutant polypeptide is of the Formula:

Xaa at position 42 is Gly, Asp, Ser, Ile, Leu, Met, Tyr,
or Ala;
Xaa at position 45 is Gln, Val, Met or Asn;
15 Xaa at position 46 is Asp, Ser, Gln, His or Val;
Xaa at position 50 is Glu or Asp;
Xaa at position 51 is Asn, Pro or Thr;
Xaa at position 62 is Asn or Pro;
Xaa at position 76 is Ser, or Pro;
20 Xaa at position 82 is Leu, Trp, Asp, Asn Glu, His, Phe,
Ser or Tyr;
Xaa at position 95 is His, Arg, Thr, Asn or Ser;
Xaa at position 98 is His, Ile, Leu, Ala, Gln, Lys, Met,
Ser, Tyr or Val;
25 Xaa at position 100 is Lys or Arg;
Xaa at position 101 is Asp, Pro, His, Asn, Ile or Leu;
Xaa at position 105 is Asn, or Pro;
Xaa at position 108 is Arg, Ala, or Ser;
Xaa at position 116 is Lys, Val, Trp, Ala, His, Phe, or
30 Tyr;
Xaa at position 121 is Ala, or Ile;
Xaa at position 122 is Gln, or Ile; and
Xaa at position 123 is Ala, Met or Glu.

35 5. A composition, comprising:
a human interleukin-3 mutant polypeptide of the

Formula:

wherein

Xaa at position 3 is Ser, Lys, Gly, Asp, Met, Gln, or Arg;
Xaa at position 4 is Asn, His, Leu, Ile, Phe, Arg, or Gln;
30 Xaa at position 5 is Met, Phe, Ile, Arg, Gly, Ala, or Cys;
Xaa at position 6 is Ile, Cys, Gln, Glu, Arg, Pro, or Ala;
Xaa at position 7 is Asp, Phe, Lys, Arg, Ala, Gly, Glu,
Gln, Asn, Thr, Ser or Val;
Xaa at position 8 is Glu, Trp, Pro, Ser, Ala, His, Asp,
35 Asn, Gln, Leu, Val, or Gly;
Xaa at position 9 is Ile, Val, Ala, Leu, Gly, Trp, Lys,

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Phe, Leu, Ser, or Arg;
Xaa at position 10 is Ile, Gly, Val, Arg, Ser, Phe, or
Leu;
Xaa at position 11 is Thr, His, Gly, Gln, Arg, Pro, or
5 Ala;
Xaa at position 12 is His, Thr, Phe, Gly, Arg, Ala, or
Trp;
Xaa at position 13 is Leu, Gly, Arg, Thr, Ser, or Ala;
Xaa at position 14 is Lys, Arg, Leu, Gln, Gly, Pro, Val or
10 Trp;
Xaa at position 15 is Gln, Asn, Leu, Pro, Arg, or Val;
Xaa at position 16 is Pro, His, Thr, Gly, Asp, Gln, Ser,
Leu, or Lys;
Xaa at position 17 is Pro, Asp, Gly, Ala, Arg, Leu, or
15 Gln;
Xaa at position 18 is Leu, Val, Arg, Gln, Asn, Gly, Ala,
or Glu;
Xaa at position 19 is Pro, Leu, Gln, Ala, Thr, or Glu;
Xaa at position 20 is Leu, Val, Gly, Ser, Lys, Glu, Gln,
20 Thr, Arg, Ala, Phe, Ile or Met;
Xaa at position 21 is Leu, Ala, Gly, Asn, Pro, Gln, or
Val;
Xaa at position 22 is Asp, Leu, or Val;
Xaa at position 23 is Phe, Ser, Pro, Trp, or Ile;
25 Xaa at position 24 is Asn, or Ala;
Xaa at position 26 is Leu, Trp, or Arg;
Xaa at position 27 is Asn, Cys, Arg, Leu, His, Met, Pro;
Xaa at position 28 is Gly, Asp, Ser, Cys, Ala, Lys, Asn,
Thr, Leu, Val, Glu, Phe, Tyr, Ile or Met;
30 Xaa at position 29 is Glu, Asn, Tyr, Leu, Phe, Asp, Ala,
Cys, Gln, Arg, Thr, Gly or Ser;
Xaa at position 30 is Asp, Ser, Leu, Arg, Lys, Thr, Met,
Trp, Glu, Asn, Gln, Ala or Pro;
Xaa at position 31 is Gln, Pro, Phe, Val, Met, Leu, Thr,
35 Lys, Asp, Asn, Arg, Ser, Ala, Ile, Glu, His or Trp;
Xaa at position 32 is Asp, Phe, Ser, Thr, Cys, Glu, Asn,

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- Gln, Lys, His, Ala, Tyr, Ile, Val or Gly;
Xaa at position 33 is Ile, Gly, Val, Ser, Arg, Pro, or
His;
Xaa at position 34 is Leu, Ser, Cys, Arg, Ile, His, Phe,
5 Glu, Lys, Thr, Ala, Met, Val or Asn;
Xaa at position 35 is Met, Arg, Ala, Gly, Pro, Asn, His,
or Asp;
Xaa at position 36 is Glu, Leu, Thr, Asp, Tyr, Lys, Asn,
Ser, Ala, Ile, Val, His, Phe, Met or Gln;
10 Xaa at position 37 is Asn, Arg, Met, Pro, Ser, Thr, or
His;
Xaa at position 38 is Asn, His, Arg, Leu, Gly, Ser, or
Thr;
Xaa at position 39 is Leu, Thr, Ala, Gly, Glu, Pro, Lys,
15 Ser, Met, or;
Xaa at position 40 is Arg, Asp, Ile, Ser, Val, Thr, Gln,
Asn, Lys, His, Ala or Leu;
Xaa at position 41 is Arg, Thr, Val, Ser, Leu, or Gly;
Xaa at position 42 is Pro, Gly, Cys, Ser, Gln, Glu, Arg,
20 His, Thr, Ala, Tyr, Phe, Leu, Val or Lys;
Xaa at position 43 is Asn or Gly;
Xaa at position 44 is Leu, Ser, Asp, Arg, Gln, Val, or
Cys;
Xaa at position 45 is Glu Tyr, His, Leu, Pro, or Arg;
25 Xaa at position 46 is Ala, Ser, Pro, Tyr, Asn, or Thr;
Xaa at position 47 is Phe, Asn, Glu, Pro, Lys, Arg, or
Ser;
Xaa at position 48 is Asn, His, Val, Arg, Pro, Thr, Asp,
or Ile;
30 Xaa at position 49 is Arg, Tyr, Trp, Lys, Ser, His, Pro,
or Val;
Xaa at position 50 is Ala, Asn, Pro, Ser, or Lys;
Xaa at position 51 is Val, Thr, Pro, His, Leu, Phe, or
Ser;
35 Xaa at position 52 is Lys, Ile, Arg, Val, Asn, Glu, or
Ser;

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- Xaa at position 53 is Ser, Ala, Phe, Val, Gly, Asn, Ile,
Pro, or His;
- Xaa at position 54 is Leu, Val, Trp, Ser, Ile, Phe, Thr,
or His;
- 5 Xaa at position 55 is Gln, Ala, Pro, Thr, Glu, Arg, Trp,
Gly, or Leu;
- Xaa at position 56 is Asn, Leu, Val, Trp, Pro, or Ala;
- Xaa at position 57 is Ala, Met, Leu, Pro, Arg, Glu, Thr,
Gln, Trp, or Asn;
- 10 Xaa at position 58 is Ser, Glu, Met, Ala, His, Asn, Arg,
or Asp;
- Xaa at position 59 is Ala, Glu, Asp, Leu, Ser, Gly, Thr,
or Arg;
- Xaa at position 60 is Ile, Met, Thr, Pro, Arg, Gly, Ala;
- 15 Xaa at position 61 is Glu, Lys, Gly, Asp, Pro, Trp, Arg,
Ser, Gln, or Leu;
- Xaa at position 62 is Ser, Val, Ala, Asn, Trp, Glu, Pro,
Gly, or Asp;
- Xaa at position 63 is Ile, Ser, Arg, Thr, or Leu;
- 20 Xaa at position 64 is Leu, Ala, Ser, Glu, Phe, Gly, or
Arg;
- Xaa at position 65 is Lys, Thr, Gly, Asn, Met, Arg, Ile,
or Asp;
- Xaa at position 66 is Asn, Trp, Val, Gly, Thr, Leu, Glu,
or Arg;
- 25 Xaa at position 67 is Leu, Gln, Gly, Ala, Trp, Arg, Val,
or Lys;
- Xaa at position 68 is Leu, Gln, Lys, Trp, Arg, Asp, Glu,
Asn, His, Thr, Ser, Ala, Tyr, Phe, Ile, Met or Val;
- 30 Xaa at position 69 is Pro, Ala, Thr, Trp, Arg, or Met;
- Xaa at position 70 is Cys, Glu, Gly, Arg, Met, or Val;
- Xaa at position 71 is Leu, Asn, Val, or Gln;
- Xaa at position 72 is Pro, Cys, Arg, Ala, or Lys;
- Xaa at position 73 is Leu, Ser, Trp, or Gly;
- 35 Xaa at position 74 is Ala, Lys, Arg, Val, or Trp;
- Xaa at position 75 is Thr, Asp, Cys, Leu, Val, Glu, His,

- Asn, or Ser;
- Xaa at position 76 is Ala, Pro, Ser, Thr, Gly, Asp, Ile,
or Met;
- 5 Xaa at position 77 is Ala, Pro, Ser, Thr, Phe, Leu, Asp,
or His;
- Xaa at position 78 is Pro, Phe, Arg, Ser, Lys, His, Ala,
Gly, Ile or Leu;
- Xaa at position 79 is Thr, Asp, Ser, Asn, Pro, Ala, Leu,
or Arg;
- 10 Xaa at position 80 is Arg, Ile, Ser, Glu, Leu, Val, Gln,
Lys, His, Ala or Pro;
- Xaa at position 81 is His, Gln, Pro, Arg, Val, Leu, Gly,
Thr, Asn, Lys, Ser, Ala, Trp, Phe, Ile or Tyr;
- Xaa at position 82 is Pro, Lys, Tyr, Gly, Ile, or Thr;
- 15 Xaa at position 83 is Ile, Val, Lys, Ala, or Asn;
- Xaa at position 84 is His, Ile, Asn, Leu, Asp, Ala, Thr,
Glu, Gln, Ser, Phe, Met, Val, Lys, Arg, Tyr or Pro;
- Xaa at position 85 is Ile, Leu, Arg, Asp, Val, Pro, Gln,
Gly, Ser, Phe, or His;
- 20 Xaa at position 86 is Lys, Tyr, Leu, His, Arg, Ile, Ser,
Gln, Pro;
- Xaa at position 87 is Asp, Pro, Met, Lys, His, Thr, Val,
Tyr, Glu, Asn, Ser, Ala, Gly, Ile, Leu or Gln;
- Xaa at position 88 is Gly, Leu, Glu, Lys, Ser, Tyr, or
25 Pro;
- Xaa at position 89 is Asp, or Ser;
- Xaa at position 90 is Trp, Val, Cys, Tyr, Thr, Met, Pro,
Leu, Gln, Lys, Ala, Phe, or Gly;
- Xaa at position 91 is Asn, Pro, Ala, Phe, Ser, Trp, Gln,
30 Tyr, Leu, Lys, Ile, Asp, or His;
- Xaa at position 92 is Glu, Ser, Ala, Lys, Thr, Ile, Gly,
or Pro;
- Xaa at position 94 is Arg, Lys, Asp, Leu, Thr, Ile, Gln,
His, Ser, Ala, or Pro;
- 35 Xaa at position 95 is Arg, Thr, Pro, Glu, Tyr, Leu, Ser,
or Gly;

- Xaa at position 96 is Lys, Asn, Thr, Leu, Gln, Arg,
His, Glu, Ser, Ala or Trp;
Xaa at position 97 is Leu, Ile, Arg, Asp, or Met;
Xaa at position 98 is Thr, Val, Gln, Tyr, Glu, His, Ser,
5 or Phe;
Xaa at position 99 is Phe, Ser, Cys, His, Gly, Trp, Tyr,
Asp, Lys, Leu, Ile, Val or Asn;
Xaa at position 100 is Tyr, Cys, His, Ser, Trp, Arg, or
Leu;
10 Xaa at position 101 is Leu, Asn, Val, Pro, Arg, Ala, His,
Thr, Trp, or Met;
Xaa at position 102 is Lys, Leu, Pro, Thr, Met, Asp, Val,
Glu, Arg, Trp, Ser, Asn, His, Ala, Tyr, Phe, Gln, or
Ile;
15 Xaa at position 103 is Thr, Ser, Asn, Ile, Trp, Lys, or
Pro;
Xaa at position 104 is Leu, Ser, Pro, Ala, Glu, Cys, Asp,
or Tyr;
Xaa at position 105 is Glu, Ser, Lys, Pro, Leu, Thr, Tyr,
20 or Arg;
Xaa at position 106 is Asn, Ala, Pro, Leu, His, Val, or
Gln;
Xaa at position 107 is Ala, Ser, Ile, Asn, Pro, Lys, Asp,
or Gly;
25 Xaa at position 108 is Gln, Ser, Met, Trp, Arg, Phe, Pro,
His, Ile, Tyr, or Cys;
Xaa at position 109 is Ala, Met, Glu, His, Ser, Pro, Tyr,
or Leu;
30 and which can additionally have Met- or Met-Ala- preceding
the amino acid in position 1; and wherein from 4 to 44 of
the amino acids designated by Xaa are different from the
corresponding native amino acids of (1-133) human
interleukin-3;
35 a colony stimulating factor selected from the group
consisting of GM-CSF, CSF-1, G-CSF, Meg-CSF (more recently

referred to as c-mpl ligand), M-CSF, erythropoietin (EPO),
 IL-1, IL-4, IL-2, IL-5, IL-6, IL-7, IL-8, IL-9, IL-10, IL-
 11, IL-12, IL-13, LIF, flt3/flk2, human growth hormone, B-
 cell growth factor, B-cell differentiation factor,
 5 eosinophil differentiation factor and stem cell factor
 (SCF); and

at least one non-toxic pharmaceutically acceptable
 carrier.

10 6. A composition of claim 5, wherein said human
 interleukin-3 mutant polypeptide is of the Formula:

Asn	Cys	Xaa	Xaa	Xaa	Ile	Xaa	Glu	Xaa	Xaa	Xaa	Xaa	Leu	Lys	Xaa
1					5					10				15
Xaa	Xaa	Xaa	Xaa	Xaa	Xaa	Asp	Xaa	Xaa	Asn	Leu	Asn	Xaa	Glu	Xaa
					20				25				30	
Xaa	Xaa	Ile	Leu	Met	Xaa	Xaa	Asn	Leu	Xaa	Xaa	Xaa	Asn	Leu	Glu
20					35				40				45	
Xaa	Phe	Xaa	Xaa	Xaa	Xaa	Xaa	Xaa	Xaa	Xaa	Asn	Xaa	Xaa	Xaa	Ile
					50				55				60	
Glu	Xaa	Xaa	Leu	Xaa	Xaa	Leu	Xaa	Xaa	Cys	Xaa	Pro	Xaa	Xaa	Thr
25					65				70				75	
Ala	Xaa	Pro	Xaa	Arg	Xaa	Xaa	Xaa	Xaa	Xaa	Xaa	Xaa	Gly	Asp	Xaa
					80				85				90	
Xaa	Xaa	Phe	Xaa	Xaa	Lys	Leu	Xaa	Phe	Xaa	Xaa	Xaa	Xaa	Leu	Glu
					95				100				105	
Xaa	Xaa	Xaa	Xaa	Gln	Gln	[SEQ ID NO:5]								
35														

wherein

Xaa at position 3 is Ser, Gly, Asp, Met, or Gln;

Xaa at position 4 is Asn, His, or Ile;

5 Xaa at position 5 is Met or Ile;

Xaa at position 7 is Asp or Glu;

Xaa at position 9 is Ile, Ala, Leu, or Gly;

Xaa at position 10 is Ile, Val, or Leu;

Xaa at position 11 is Thr, His, Gln, or Ala;

10 Xaa at position 12 is His or Ala;

Xaa at position 15 is Gln, Asn, or Val;

Xaa at position 16 is Pro, Gly, or Gln;

Xaa at position 17 is Pro, Asp, Gly, or Gln;

Xaa at position 18 is Leu, Arg, Gln, Asn, Gly, Ala, or

15 Glu;

Xaa at position 19 is Pro or Glu;

Xaa at position 20 is Leu, Val, Gly, Ser, Lys, Ala, Arg,

Gln, Glu, Ile, Phe, Thr or Met;

Xaa at position 21 is Leu, Ala, Asn, Pro, Gln, or Val;

20 Xaa at position 23 is Phe, Ser, Pro, or Trp;

Xaa at position 24 is Asn or Ala;

Xaa at position 28 is Gly, Asp, Ser, Cys, Ala, Asn, Ile,

Leu, Met Tyr or Arg;

Xaa at position 30 is Asp or Glu;

25 Xaa at position 31 is Gln, Val, Met, Leu, Thr, Ala, Asn,

Glu, Ser or Lys;

Xaa at position 32 is Asp, Phe, Ser, Thr, Ala, Asn, Gln,

Glu, His, Ile, Lys, Tyr, Val or Cys;

Xaa at position 36 is Glu, Ala, Asn, Ser or Asp;

30 Xaa at position 37 is Asn, Arg, Met, Pro, Ser, Thr, or

His;

Xaa at position 40 is Arg or Ala;

Xaa at position 41 is Arg, Thr, Val, Leu, or Gly;

Xaa at position 42 is Pro, Gly, Ser, Gln, Ala, Arg, Asn,

35 Glu, Leu, Thr, Val or Lys;

Xaa at position 46 is Ala or Ser;

- Xaa at position 48 is Asn, Pro, Thr, or Ile;
Xaa at position 49 is Arg or Lys;
Xaa at position 50 is Ala or Asn;
Xaa at position 51 is Val or Thr;
5 Xaa at position 52 is Lys or Arg;
Xaa at position 53 is Ser, Phe, or His;
Xaa at position 54 is Leu, Ile, Phe, or His;
Xaa at position 55 is Gln, Ala, Pro, Thr, Glu, Arg, or
Gly;
10 Xaa at position 57 is Ala, Pro, or Arg;
Xaa at position 58 is Ser, Glu, Arg, or Asp;
Xaa at position 59 is Ala or Leu;
Xaa at position 62 is Ser, Val, Ala, Asn, Glu, Pro, or,
Gly;
15 Xaa at position 63 is Ile or Leu;
Xaa at position 65 is Lys, Thr, Gly, Asn, Met, Arg, Ile,
Gly, or Asp;
Xaa at position 66 is Asn, Gly, Glu, or Arg;
Xaa at position 68 is Leu, Gln, Trp, Arg, Asp, Ala, Asn,
20 Glu, His, Ile, Met, Phe, Ser, Thr, Tyr or Val;
Xaa at position 69 is Pro or Thr;
Xaa at position 71 is Leu or Val;
Xaa at position 73 is Leu or Ser;
Xaa at position 74 is Ala or Trp;
25 Xaa at position 77 is Ala or Pro;
Xaa at position 79 is Thr, Asp, Ser, Pro, Ala, Leu, or
Arg;
Xaa at position 81 is His, Pro, Arg, Val, Leu, Gly, Asn,
Phe, Ser or Thr;
30 Xaa at position 82 is Pro or Tyr;
Xaa at position 83 is Ile or Val;
Xaa at position 84 is His, Ile, Asn, Leu, Ala, Thr, Leu,
Arg, Gln, Leu, Lys, Met, Ser, Tyr, Val or Pro;
Xaa at position 85 is Ile, Leu, or Val;
35 Xaa at position 86 is Lys, Arg, Ile, Gln, Pro, or Ser;
Xaa at position 87 is Asp, Pro, Met, Lys, His, Thr, Asn,

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- Ile, Leu or Tyr;
 Xaa at position 90 is Trp or Leu;
 Xaa at position 91 is Asn, Pro, Ala, Ser, Trp, Gln, Tyr,
 Leu, Lys, Ile, Asp, or His;
 5 Xaa at position 92 is Glu, or Gly;
 Xaa at position 94 is Arg, Ala, or Ser;
 Xaa at position 95 is Arg, Thr, Glu, Leu, or Ser;
 Xaa at position 98 is Thr, Val, or Gln;
 Xaa at position 100 is Tyr or Trp;
 10 Xaa at position 101 is Leu or Ala;
 Xaa at position 102 is Lys, Thr, Val, Trp, Ser, Ala, His,
 Met, Phe, Tyr or Ile;
 Xaa at position 103 is Thr or Ser;
 Xaa at position 106 is Asn, Pro, Leu, His, Val, or Gln;
 15 Xaa at position 107 is Ala, Ser, Ile, Asn, Pro, Asp, or
 Gly;
 Xaa at position 108 is Gln, Ser, Met, Trp, Arg, Phe, Pro,
 His, Ile, Tyr, or Cys;
 Xaa at position 109 is Ala, Met, Glu, His, Ser, Pro, Tyr,
 20 or Leu;

- which can additionally have Met- or Met-Ala- preceding the
 amino acid in position 1; and wherein from 4 to 35 of the
 amino acids designated by Xaa are different from the
 25 corresponding amino acids of native human interleukin-3.

7. A composition of claim 6, wherein said human
 interleukin-3 mutant polypeptide is of the Formula:

- 30 Asn Cys Xaa Xaa Met Ile Asp Glu Xaa Ile Xaa Xaa Leu Lys Xaa
 1 5 10 15
 Xaa Pro Xaa Pro Xaa Xaa Asp Phe Xaa Asn Leu Asn Xaa Glu Asp
 20 25 30
 35 Xaa Xaa Ile Leu Met Xaa Xaa Asn Leu Arg Xaa Xaa Asn Leu Glu

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	35	40	45
	Ala Phe Xaa Arg Xaa Xaa Lys Xaa Xaa Xaa Asn Ala Ser Ala Ile		
	50	55	60
5	Glu Xaa Xaa Leu Xaa Xaa Leu Xaa Pro Cys Leu Pro Xaa Xaa Thr		
	65	70	75
	Ala Xaa Pro Xaa Arg Xaa Pro Ile Xaa Xaa Xaa Xaa Gly Asp Trp		
10	80	85	90
	Xaa Glu Phe Xaa Xaa Lys Leu Xaa Phe Tyr Leu Xaa Xaa Leu Glu		
	95	100	105
15	Xaa Xaa Xaa Xaa Gln Gln [SEQ ID NO:6]		
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wherein

- Xaa at position 3 is Ser, Gly, Asp, or Gln;
- 20 Xaa at position 4 is Asn, His, or Ile;
- Xaa at position 9 is Ile, Ala, Leu, or Gly;
- Xaa at position 11 is Thr, His, or Gln;
- Xaa at position 12 is His or Ala;
- Xaa at position 15 is Gln or Asn;
- 25 Xaa at position 16 is Pro or Gly;
- Xaa at position 18 is Leu, Arg, Asn, or Ala;
- Xaa at position 20 is Leu, Val, Ser, Ala, Arg, Gln, Glu, Ile, Phe, Thr or Met;
- Xaa at position 21 is Leu, Ala, Asn, or Pro;
- 30 Xaa at position 24 is Asn or Ala;
- Xaa at position 28 is Gly, Asp, Ser, Ala, Asn, Ile, Leu, Met, Tyr or Arg;
- Xaa at position 31 is Gln, Val, Met, Leu, Ala, Asn, Glu or Lys;
- 35 Xaa at position 32 is Asp, Phe, Ser, Ala, Gln, Glu, His, Val or Thr;

- Xaa at position 36 is Glu, Asn, Ser or Asp;
Xaa at position 37 is Asn, Arg, Pro, Thr, or His;
Xaa at position 41 is Arg, Leu, or Gly;
Xaa at position 42 is Pro, Gly, Ser, Ala, Asn, Val, Leu or
5 Gln;
Xaa at position 48 is Asn, Pro, or Thr;
Xaa at position 50 is Ala or Asn;
Xaa at position 51 is Val or Thr;
Xaa at position 53 is Ser or Phe;
10 Xaa at position 54 is Leu or Phe;
Xaa at position 55 is Gln, Ala, Glu, or Arg;
Xaa at position 62 is Ser, Val, Asn, Pro, or Gly;
Xaa at position 63 is Ile or Leu;
Xaa at position 65 is Lys, Asn, Met, Arg, Ile, or Gly;
15 Xaa at position 66 is Asn, Gly, Glu, or Arg;
Xaa at position 68 is Leu, Gln, Trp, Arg, Asp, Asn, Glu,
His, Met, Phe, Ser, Thr, Tyr or Val;
Xaa at position 73 is Leu or Ser;
Xaa at position 74 is Ala or Trp;
20 Xaa at position 77 is Ala or Pro;
Xaa at position 79 is Thr, Asp, or Ala;
Xaa at position 81 is His, Pro, Arg, Val, Gly, Asn, Ser or
Thr;
Xaa at position 84 is His, Ile, Asn, Ala, Thr, Arg, Gln,
25 Glu, Lys, Met, Ser, Tyr, Val or Leu;
Xaa at position 85 is Ile or Leu;
Xaa at position 86 is Lys or Arg;
Xaa at position 87 is Asp, Pro, Met, Lys, His, Pro, Asn,
Ile, Leu or Tyr;
30 Xaa at position 91 is Asn, Pro, Ser, Ile or Asp;
Xaa at position 94 is Arg, Ala, or Ser;
Xaa at position 95 is Arg, Thr, Glu, Leu, or Ser;
Xaa at position 98 is Thr or Gln;
Xaa at position 102 is Lys, Val, Trp, or Ile;
35 Xaa at position 103 is Thr, Ala, His, Phe, Tyr or Ser;
Xaa at position 106 is Asn, Pro, Leu, His, Val, or Gln;

Xaa at position 107 is Ala, Ser, Ile, Pro, or Asp;
Xaa at position 108 is Gln, Met, Trp, Phe, Pro, His, Ile,
or Tyr;
Xaa at position 109 is Ala, Met, Glu, Ser, or Leu;

5

and which can additionally have Met- or Met-Ala- preceding
the amino acid in position 1; and wherein from 4 to 26 of
the amino acids designated by Xaa are different from the
corresponding amino acids of native (1-133)human

10 interleukin-3.

8. The composition of claim 7, wherein said human
interleukin-3 mutant polypeptide is of the Formula:

15

Xaa at position 17 is Ser, Lys, Asp, Met, Gln, or Arg;
Xaa at position 18 is Asn, His, Leu, Ile, Phe, Arg, or
Gln;

Xaa at position 19 is Met, Arg, Gly, Ala, or Cys;

20 Xaa at position 20 is Ile, Cys, Gln, Glu, Arg, Pro, or
Ala;

Xaa at position 21 is Asp, Phe, Lys, Arg, Ala, Gly, or
Val;

25 Xaa at position 22 is Glu, Trp, Pro, Ser, Ala, His, or
Gly;

Xaa at position 23 is Ile, Ala, Gly, Trp, Lys, Leu, Ser,
or Arg;

Xaa at position 24 is Ile, Gly, Arg, or Ser;

30 Xaa at position 25 is Thr, His, Gly, Gln, Arg, Pro, or
Ala;

Xaa at position 26 is His, Thr, Phe, Gly, Ala, or Trp;

Xaa at position 27 is Leu, Gly, Arg, Thr, Ser, or Ala;

Xaa at position 28 is Lys, Leu, Gln, Gly, Pro, Val or Trp;

Xaa at position 29 is Gln, Asn, Pro, Arg, or Val;

35 Xaa at position 30 is Pro, His, Thr, Gly, Asp, Gln, Ser,
Leu, or Lys;

- Xaa at position 31 is Pro, Asp, Gly, Arg, Leu, or Gln;
Xaa at position 32 is Leu, Arg, Gln, Asn, Gly, Ala, or
Glu;
- Xaa at position 33 is Pro, Leu, Gln, Thr, or Glu;
- 5 Xaa at position 34 is Leu, Gly, Ser, or Lys;
Xaa at position 35 is Leu, Ala, Gly, Asn, Pro, or Gln;
Xaa at position 36 is Asp, Leu, or Val;
Xaa at position 37 is Phe, Ser, or Pro;
Xaa at position 38 is Asn, or Ala;
- 10 Xaa at position 40 is Leu, Trp, or Arg;
Xaa at position 41 is Asn, Cys, Arg, Leu, His, Met, Pro;
Xaa at position 42 is Gly, Asp, Ser, Cys, or Ala;
Xaa at position 42 is Glu, Asn, Tyr, Leu, Phe, Asp, Ala,
Cys, or Ser;
- 15 Xaa at position 44 is Asp, Ser, Leu, Arg, Lys, Thr, Met,
Trp, or Pro;
Xaa at position 45 is Gln, Pro, Phe, Val, Met, Leu, Thr,
Lys, or Trp;
Xaa at position 46 is Asp, Phe, Ser, Thr, Cys, or Gly;
- 20 Xaa at position 47 is Ile, Gly, Ser, Arg, Pro, or His;
Xaa at position 48 is Leu, Ser, Cys, Arg, His, Phe, or
Asn;
Xaa at position 49 is Met, Arg, Ala, Gly, Pro, Asn, His,
or Asp;
- 25 Xaa at position 50 is Glu, Leu, Thr, Asp, or Tyr;
Xaa at position 51 is Asn, Arg, Met, Pro, Ser, Thr, or
His;
Xaa at position 52 is Asn, His, Arg, Leu, Gly, Ser, or
Thr;
- 30 Xaa at position 53 is Leu, Thr, Ala, Gly, Glu, Pro, Lys,
Ser, or;
Xaa at position 54 is Arg, Asp, Ile, Ser, Val, Thr, Gln,
or Leu;
Xaa at position 55 is Arg, Thr, Val, Ser, Leu, or Gly;
- 35 Xaa at position 56 is Pro, Gly, Cys, Ser, Gln, or Lys;
Xaa at position 57 is Asn or Gly;

- Xaa at position 58 is Leu, Ser, Asp, Arg, Gln, Val, or Cys;
- Xaa at position 59 is Glu Tyr, His, Leu, Pro, or Arg;
- Xaa at position 60 is Ala, Ser, Tyr, Asn, or Thr;
- 5 Xaa at position 61 is Phe, Asn, Glu, Pro, Lys, Arg, or Ser;
- Xaa at position 62 is Asn His, Val, Arg, Pro, Thr, or Ile;
- Xaa at position 63 is Arg, Tyr, Trp, Ser, Pro, or Val;
- Xaa at position 64 is Ala, Asn, Ser, or Lys;
- 10 Xaa at position 65 is Val, Thr, Pro, His, Leu, Phe, or Ser;
- Xaa at position 66 is Lys, Ile, Val, Asn, Glu, or Ser;
- Xaa at position 67 is Ser, Ala, Phe, Val, Gly, Asn, Ile, Pro, or His;
- 15 Xaa at position 68 is Leu, Val, Trp, Ser, Thr, or His;
- Xaa at position 69 is Gln, Ala, Pro, Thr, Arg, Trp, Gly, or Leu;
- Xaa at position 70 is Asn, Leu, Val, Trp, Pro, or Ala;
- Xaa at position 71 is Ala, Met, Leu, Arg, Glu, Thr, Gln, Trp, or Asn;
- 20 Xaa at position 72 is Ser, Glu, Met, Ala, His, Asn, Arg, or Asp;
- Xaa at position 73 is Ala, Glu, Asp, Leu, Ser, Gly, Thr, or Arg;
- 25 Xaa at position 74 is Ile, Thr, Pro, Arg, Gly, Ala;
- Xaa at position 75 is Glu, Lys, Gly, Asp, Pro, Trp, Arg, Ser, or Leu;
- Xaa at position 76 is Ser, Val, Ala, Asn, Trp, Glu, Pro, Gly, or Asp;
- 30 Xaa at position 77 is Ile, Ser, Arg, or Thr;
- Xaa at position 78 is Leu, Ala, Ser, Glu, Gly, or Arg;
- Xaa at position 79 is Lys, Thr, Gly, Asn, Met, Ile, or Asp;
- Xaa at position 80 is Asn, Trp, Val, Gly, Thr, Leu, or Arg;
- 35 Xaa at position 81 is Leu, Gln, Gly, Ala, Trp, Arg, or

Lys;

Xaa at position 82 is Leu, Gln, Lys, Trp, Arg, or Asp;
Xaa at position 83 is Pro, Thr, Trp, Arg, or Met;
Xaa at position 84 is Cys, Glu, Gly, Arg, Met, or Val;
5 Xaa at position 85 is Leu, Asn, or Gln;
Xaa at position 86 is Pro, Cys, Arg, Ala, or Lys;
Xaa at position 87 is Leu, Ser, Trp, or Gly;
Xaa at position 88 is Ala, Lys, Arg, Val, or Trp;
Xaa at position 89 is Thr, Asp, Cys, Leu, Val, Glu, His,
10 or Asn;
Xaa at position 90 is Ala, Ser, Asp, Ile, or Met;
Xaa at position 91 is Ala, Ser, Thr, Phe, Leu, Asp, or
His;
Xaa at position 92 is Pro, Phe, Arg, Ser, Lys, His, or
15 Leu;
Xaa at position 93 is Thr, Asp, Ser, Asn, Pro, Ala, Leu,
or Arg;
Xaa at position 94 is Arg, Ile, Ser, Glu, Leu, Val, or
Pro;
20 Xaa at position 95 is His, Gln, Pro, Val, Leu, Thr or Tyr;
Xaa at position 96 is Pro, Lys, Tyr, Gly, Ile, or Thr;
Xaa at position 97 is Ile, Lys, Ala, or Asn;
Xaa at position 98 is His, Ile, Asn, Leu, Asp, Ala, Thr,
or Pro;
25 Xaa at position 99 is Ile, Arg, Asp, Pro, Gln, Gly, Phe,
or His;
Xaa at position 100 is Lys, Tyr, Leu, His, Ile, Ser, Gln,
or Pro;
Xaa at position 101 is Asp, Pro, Met, Lys, His, Thr, Val,
30 Tyr, or Gln;
Xaa at position 102 is Gly, Leu, Glu, Lys, Ser, Tyr, or
Pro;
Xaa at position 103 is Asp, or Ser;
Xaa at position 104 is Trp, Val, Cys, Tyr, Thr, Met, Pro,
35 Leu, Gln, Lys, Ala, Phe, or Gly;
Xaa at position 105 is Asn, Pro, Ala, Phe, Ser, Trp, Gln,

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Tyr, Leu, Lys, Ile, or His;
 Xaa at position 106 is Glu, Ser, Ala, Lys, Thr, Ile, Gly,
 or Pro;
 Xaa at position 108 is Arg, Asp, Leu, Thr, Ile, or Pro;
 5 Xaa at position 109 is Arg, Thr, Pro, Glu, Tyr, Leu, Ser,
 or Gly.

9. A composition of claim 8, wherein said human
 interleukin-3 mutant polypeptide is of the Formula:

10

	1		5		10
	(Met) _m -Ala	Pro	Met	Thr	Gln Thr Thr Ser Leu Lys Thr
		15		20	
	Ser Trp Val	Asn Cys	Ser Xaa Xaa Xaa	Asp Glu Ile Ile	
15	25		30		35
	Xaa His Leu Lys	Xaa Pro Pro	Xaa Pro Xaa	Leu Asp Xaa	
		40		45	50
	Xaa Asn Leu Asn	Xaa Glu Asp	Xaa Asp Ile	Leu Xaa Glu	
		55		60	
20	Xaa Asn Leu Arg	Xaa Xaa Asn Leu	Xaa Xaa Phe	Xaa Xaa	
		65		70	75
	Ala Xaa Lys Xaa	Leu Xaa Asn Ala	Ser Xaa Ile	Glu Xaa	
		80		85	
	Ile Leu Xaa Asn	Leu Xaa Pro Cys	Xaa Pro Xaa	Xaa Thr	
25	90		95		100
	Ala Xaa Pro Xaa	Arg Xaa Pro	Ile Xaa Ile	Xaa Xaa Gly	
		105		110	115
	Asp Trp Xaa Glu	Phe Arg Xaa	Lys Leu Xaa	Phe Tyr Leu	
		120		125	
30	Xaa Xaa Leu Glu	Xaa Ala Gln	Xaa Gln Gln	Thr Thr Leu	
		130			
	Ser Leu Ala Ile	Phe [SEQ ID NO:7]			

wherein m is 0 or 1; Xaa at position 18 is Asn or Ile; Xaa
 35 at position 19 is Met, Ala or Ile; Xaa at position 20 is
 Ile, Pro or Ile; Xaa at position 23 is Ile, Ala or Leu; Xaa

at position 25 is Thr or His; Xaa at position 29 is Gln, Arg, Val or Ile; Xaa at position 32 is Leu, Ala, Asn or Arg; Xaa at position 34 is Leu or Ser; Xaa at position 37 is Phe, Pro, or Ser; Xaa at position 38 is Asn or Ala; Xaa at position 42 is Gly, Ala, Ser, Asp or Asn; Xaa at position 45 is Gln, Val, or Met; Xaa at position 46 is Asp or Ser; Xaa at position 49 is Met, Ile, Leu or Asp; Xaa at position 50 is Glu or Asp; Xaa at position 51 is Asn Arg or Ser; Xaa at position 55 is Arg, Leu, or Thr; Xaa at position 56 is Pro or Ser; Xaa at position 59 is Glu or Leu; Xaa at position 60 is Ala or Ser; Xaa at position 62 is Asn, Val or Pro; Xaa at position 63 is Arg or His; Xaa at position 65 is Val or Ser; Xaa at position 67 is Ser, Asn, His or Gln; Xaa at position 69 is Gln or Glu; Xaa at position 73 is Ala or Gly; Xaa at position 76 is Ser, Ala or Pro; Xaa at position 79 is Lys, Arg or Ser; Xaa at position 82 is Leu, Glu, Val or Trp; Xaa at position 85 is Leu or Val; Xaa at position 87 is Leu, Ser, Tyr; Xaa at position 88 is Ala or Trp; Xaa at position 91 is Ala or Pro; Xaa at position 93 is Pro or Ser; Xaa at position 95 is His or Thr; Xaa at position 98 is His, Ile, or Thr; Xaa at position 100 is Lys or Arg; Xaa at position 101 is Asp, Ala or Met; Xaa at position 105 is Asn or Glu; Xaa at position 109 is Arg, Glu or Leu; Xaa at position 112 is Thr or Gln; Xaa at position 116 is Lys, Val, Trp or Ser; Xaa at position 117 is Thr or Ser; Xaa at position 120 is Asn, Gln, or His; Xaa at position 123 is Ala or Glu; with the proviso that from four to forty-four of the amino acids designated by Xaa are different from the corresponding amino acids of native human interleukin-3.

10. The composition of claim 9, wherein said human interleukin-3 mutant polypeptide is of the Formula:

35 1 5 10
(Met_m-Ala_n)_p-Asn Cys Ser Xaa Xaa Xaa Asp Glu Xaa Ile

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Xaa His Leu Lys Xaa Pro Pro Xaa Pro Xaa Leu Asp Xaa
25 30 35
Xaa Asn Leu Asn Xaa Glu Asp Xaa Xaa Ile Leu Xaa Glu

5

				40				45					
	Xaa	Asn	Leu	Arg	Xaa	Xaa	Asn	Leu	Xaa	Xaa	Phe	Xaa	Xaa
	50						55				60		
	Ala	Xaa	Lys	Xaa	Leu	Xaa	Asn	Ala	Ser	Xaa	Ile	Glu	Xaa
5			65					70				75	
	Ile	Leu	Xaa	Asn	Xaa	Xaa	Pro	Cys	Xaa	Pro	Xaa	Ala	Thr
				80						85			
	Ala	Xaa	Pro	Xaa	Arg	Xaa	Pro	Ile	Xaa	Ile	Xaa	Xaa	Gly
		90					95					100	
10	Asp	Trp	Xaa	Glu	Phe	Arg	Xaa	Lys	Leu	Xaa	Phe	Tyr	Leu
				105						110			
	Xaa	Xaa	Leu	Glu	Xaa	Ala	Gln	Xaa	Gln	Gln	[SEQ ID NO:8]		

wherein m is 0 or 1; n is 0 or 1; p is 0 or 1; Xaa at position 4 is Asn or Ile; Xaa at position 5 is Met, Ala or Ile; Xaa at position 6 is Ile, Pro or Leu; Xaa at position 9 is Ile, Ala or Leu; Xaa at position 11 is Thr or His; Xaa at position 15 is Gln, Arg, Val or Ile; Xaa at position 18 is Leu, Ala, Asn or Arg; Xaa at position 20 is Leu or Ser; Xaa at position 23 is Phe, Pro, or Ser; Xaa at position 24 is Asn or Ala; Xaa at position 28 is Gly, Ala, Ser, Asp or Asn; Xaa at position 31 is Gln, Val, or Met; Xaa at position 32 is Asp or Ser; Xaa at position 35 is Met, Ile or Asp; Xaa at position 36 is Glu or Asp; Xaa at position 37 is Asn, Arg or Ser; Xaa at position 41 is Arg, Leu, or Thr; Xaa at position 42 is Pro or Ser; Xaa at position 45 is Glu or Leu; Xaa at position 46 is Ala or Ser; Xaa at position 48 is Asn, Val or Pro; Xaa at position 49 is Arg or His; Xaa at position 51 is Val or Ser; Xaa at position 53 is Ser, Asn, His or Gln; Xaa at position 55 is Gln or Glu; Xaa at position 59 is Ala or Gly; Xaa at position 62 is Ser, Ala or Pro; Xaa at position 65 is Lys, Arg or Ser; Xaa at position 67 is Leu, Glu, or Val; Xaa at position 68 is Leu, Glu, Val or Trp; Xaa at position 71 is Leu or Val; Xaa at position 73 is Leu, Ser or Tyr; Xaa at position 74 is Ala or Trp; Xaa at position 77 is Ala or Pro; Xaa at

position 79 is Pro or Ser; Xaa at position 81 is His or Thr; Xaa at position 84 is His, Ile, or Thr; Xaa at position 86 is Lys or Arg; Xaa at position 87 is Asp, Ala or Met; Xaa at position 91 is Asn or Glu; Xaa at position 5 95 is Arg, Glu, Leu; Xaa at position 98 Thr or Gln; Xaa at position 102 is Lys, Val, Trp or Ser; Xaa at position 103 is Thr or Ser; Xaa at position 106 is Asn, Gln, or His; Xaa at position 109 is Ala or Glu; with the proviso that from 10 four to forty-four of the amino acids designated by Xaa are different from the corresponding amino acids of native (15-125)human interleukin-3.

11. The composition of claim 10, wherein said human interleukin-3 mutant polypeptide is of the Formula:

15

Asn Cys Ser Ile Met Ile Asp Glu Ile Ile His His Leu
Lys Arg Pro Pro Ala Pro Leu Leu Asp Pro Asn Asn Leu Asn Ala
Glu Asp Val Asp Ile Leu Met Glu Asn Asn Leu Arg Arg Pro Asn
Leu Glu Ala Phe Asn Arg Ala Val Lys Ser Leu Gln Asn Ala Ser
20 Ala Ile Glu Ser Ile Leu Lys Asn Leu Leu Pro Cys Leu Pro Leu
Ala Thr Ala Ala Pro Thr Arg His Pro Ile His Ile Lys Asp Gly
Asp Trp Asn Glu Phe Arg Arg Lys Leu Thr Phe Tyr Leu Lys Thr
Leu Glu Asn Ala Gln Ala Gln Gln [SEQ ID NO:9];

25

Asn Cys Ser Ile Met Ile Asp Glu Ile Ile His His Leu
Lys Arg Pro Pro Asn Pro Leu Leu Asp Pro Asn Asn Leu Asn Ser
Glu Asp Met Asp Ile Leu Met Glu Asn Asn Leu Arg Arg Pro Asn
Leu Glu Ala Phe Asn Arg Ala Val Lys Ser Leu Gln Asn Ala Ser
Ala Ile Glu Ser Ile Leu Lys Asn Leu Leu Pro Cys Leu Pro Leu
30 Ala Thr Ala Ala Pro Thr Arg His Pro Ile His Ile Lys Asp Gly
Asp Trp Asn Glu Phe Arg Arg Lys Leu Thr Phe Tyr Leu Lys Thr
Leu Glu Asn Ala Gln Ala Gln Gln [SEQ ID NO:10];

35

Asn Cys Ser Ile Met Ile Asp Glu Ile Ile His His Leu
Lys Val Pro Pro Ala Pro Leu Leu Asp Ser Asn Asn Leu Asn Ser
Glu Asp Met Asp Ile Leu Met Glu Asn Asn Leu Arg Arg Pro Asn

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Leu Glu Ala Phe Asn Arg Ala Val Lys Ser Leu Gln Asn Ala Ser
Ala Ile Glu Ser Ile Leu Lys Asn Leu Leu Pro Cys Leu Pro Leu
Ala Thr Ala Ala Pro Thr Arg His Pro Ile His Ile Lys Asp Gly
Asp Trp Asn Glu Phe Arg Arg Lys Leu Thr Phe Tyr Leu Lys Thr
5 Leu Glu Asn Ala Gln Ala Gln Gln [SEQ ID NO:11];

Asn Cys Ser Asn Met Ile Asp Glu Ile Ile Thr His Leu
Lys Gln Pro Pro Leu Pro Leu Leu Asp Phe Asn Asn Leu Asn Gly
Glu Asp Gln Asp Ile Leu Met Glu Arg Asn Leu Arg Leu Pro Asn
10 Leu Leu Ala Phe Val Arg Ala Val Lys Asn Leu Glu Asn Ala Ser
Ala Ile Glu Ser Ile Leu Lys Asn Leu Leu Pro Cys Leu Pro Leu
Ala Thr Ala Ala Pro Thr Arg His Pro Ile His Ile Lys Asp Gly
Asp Trp Asn Glu Phe Arg Arg Lys Leu Thr Phe Tyr Leu Lys Thr
Leu Glu Asn Ala Gln Ala Gln Gln [SEQ ID NO:12];

15
Asn Cys Ser Asn Met Ile Asp Glu Ile Ile Thr His Leu
Lys Gln Pro Pro Leu Pro Leu Leu Asp Phe Asn Asn Leu Asn Gly
Glu Asp Gln Asp Ile Leu Met Glu Arg Asn Leu Arg Leu Pro Asn
Leu Glu Ser Phe Val Arg Ala Val Lys Asn Leu Glu Asn Ala Ser
20 Ala Ile Glu Ser Ile Leu Lys Asn Leu Leu Pro Cys Leu Pro Leu
Ala Thr Ala Ala Pro Thr Arg His Pro Ile His Ile Lys Asp Gly
Asp Trp Asn Glu Phe Arg Arg Lys Leu Thr Phe Tyr Leu Lys Thr
Leu Glu Asn Ala Gln Ala Gln Gln [SEQ ID NO:13];

25
Asn Cys Ser Asn Met Ile Asp Glu Ile Ile Thr His Leu
Lys Gln Pro Pro Leu Pro Leu Leu Asp Phe Asn Asn Leu Asn Gly
Glu Asp Gln Asp Ile Leu Met Glu Arg Asn Leu Arg Thr Pro Asn
Leu Leu Ala Phe Val Arg Ala Val Lys His Leu Glu Asn Ala Ser
Ala Ile Glu Ser Ile Leu Lys Asn Leu Leu Pro Cys Leu Pro Leu
30 Ala Thr Ala Ala Pro Thr Arg His Pro Ile His Ile Lys Asp Gly
Asp Trp Asn Glu Phe Arg Arg Lys Leu Thr Phe Tyr Leu Lys Thr
Leu Glu Asn Ala Gln Ala Gln Gln [SEQ ID NO:14];

35
Asn Cys Ser Asn Met Ile Asp Glu Ile Ile Thr His Leu
Lys Gln Pro Pro Leu Pro Leu Leu Asp Phe Asn Asn Leu Asn Gly
Glu Asp Gln Asp Ile Leu Met Glu Asn Asn Leu Arg Arg Pro Asn

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Leu Glu Ala Phe Asn Arg Ala Val Lys Ser Leu Gln Asn Ala Ser
Gly Ile Glu Ala Ile Leu Arg Asn Leu Gln Pro Cys Leu Pro Ser
Ala Thr Ala Ala Pro Ser Arg His Pro Ile Ile Ile Lys Ala Gly
Asp Trp Gln Glu Phe Arg Arg Lys Leu Thr Phe Tyr Leu Lys Thr
5 Leu Glu Asn Ala Gln Ala Gln Gln [SEQ ID NO:15];

Asn Cys Ser Asn Met Ile Asp Glu Ile Ile Thr His Leu
Lys Gln Pro Pro Leu Pro Leu Leu Asp Phe Asn Asn Leu Asn Gly
Glu Asp Gln Asp Ile Leu Met Glu Asn Asn Leu Arg Arg Pro Asn
10 Leu Glu Ala Phe Asn Arg Ala Val Lys Ser Leu Gln Asn Ala Ser
Gly Ile Glu Ala Ile Leu Arg Asn Leu Val Pro Cys Leu Pro Ser
Ala Thr Ala Ala Pro Ser Arg His Pro Ile Thr Ile Lys Ala Gly
Asp Trp Gln Glu Phe Arg Arg Lys Leu Thr Phe Tyr Leu Lys Thr
Leu Glu Asn Ala Gln Ala Gln Gln [SEQ ID NO:16];

15

Asn Cys Ser Asn Met Ile Asp Glu Ile Ile Thr His Leu
Lys Gln Pro Pro Leu Pro Leu Leu Asp Phe Asn Asn Leu Asn Gly
Glu Asp Gln Asp Ile Leu Met Glu Asn Asn Leu Arg Arg Pro Asn
Leu Glu Ala Phe Asn Arg Ala Val Lys Ser Leu Gln Asn Ala Ser
20 Ala Ile Glu Ser Ile Leu Lys Asn Leu Leu Pro Cys Leu Pro Leu
Ala Thr Ala Ala Pro Thr Arg His Pro Ile His Ile Lys Asp Gly
Asp Trp Asn Glu Phe Arg Glu Lys Leu Thr Phe Tyr Leu Val Thr
Leu Glu Gln Ala Gln Glu Gln Gln [SEQ ID NO:17];

25

Asn Cys Ser Asn Met Ile Asp Glu Ile Ile Thr His Leu
Lys Gln Pro Pro Leu Pro Leu Leu Asp Phe Asn Asn Leu Asn Gly
Glu Asp Gln Asp Ile Leu Met Glu Asn Asn Leu Arg Arg Pro Asn
Leu Glu Ala Phe Asn Arg Ala Val Lys Ser Leu Gln Asn Ala Ser
Ala Ile Glu Ser Ile Leu Lys Asn Leu Leu Pro Cys Leu Pro Leu
30 Ala Thr Ala Ala Pro Thr Arg His Pro Ile His Ile Lys Asp Gly
Asp Trp Asn Glu Phe Arg Glu Lys Leu Thr Phe Tyr Leu Val Ser
Leu Glu His Ala Gln Glu Gln Gln [SEQ ID NO:18];

35

Asn Cys Ser Asn Met Ile Asp Glu Ile Ile Thr His Leu
Lys Gln Pro Pro Leu Pro Leu Leu Asp Phe Asn Asn Leu Asn Gly
Glu Asp Gln Asp Ile Leu Met Glu Asn Asn Leu Arg Arg Pro Asn

Leu Glu Ala Phe Asn Arg Ala Val Lys Ser Leu Gln Asn Ala Ser
Gly Ile Glu Ala Ile Leu Arg Asn Leu Gln Pro Cys Leu Pro Ser
Ala Thr Ala Ala Pro Ser Arg His Pro Ile Ile Ile Lys Ala Gly
Asp Trp Gln Glu Phe Arg Glu Lys Leu Thr Phe Tyr Leu Val Thr
5 Leu Glu Gln Ala Gln Glu Gln Gln [SEQ ID NO:19];

Asn Cys Ser Asn Met Ile Asp Glu Ile Ile Thr His Leu
Lys Gln Pro Pro Leu Pro Leu Leu Asp Phe Asn Asn Leu Asn Gly
Glu Asp Gln Asp Ile Leu Met Glu Asn Asn Leu Arg Arg Pro Asn
10 Leu Glu Ala Phe Asn Arg Ala Val Lys Ser Leu Gln Asn Ala Ser
Gly Ile Glu Ala Ile Leu Arg Asn Leu Val Pro Cys Leu Pro Ser
Ala Thr Ala Ala Pro Ser Arg His Pro Ile Thr Ile Lys Ala Gly
Asp Trp Gln Glu Phe Arg Glu Lys Leu Thr Phe Tyr Leu Val Thr
Leu Glu Gln Ala Gln Glu Gln Gln [SEQ ID NO:20];

15

Asn Cys Ser Asn Met Ile Asp Glu Ile Ile Thr His Leu
Lys Gln Pro Pro Leu Pro Leu Leu Asp Phe Asn Asn Leu Asn Gly
Glu Asp Gln Asp Ile Leu Met Glu Asn Asn Leu Arg Arg Pro Asn
Leu Glu Ala Phe Asn Arg Ala Val Lys Ser Leu Gln Asn Ala Ser
20 Gly Ile Glu Ala Ile Leu Arg Asn Leu Val Pro Cys Leu Pro Ser
Ala Thr Ala Ala Pro Ser Arg His Pro Ile Thr Ile Lys Ala Gly
Asp Trp Gln Glu Phe Arg Glu Lys Leu Thr Phe Tyr Leu Val Ser
Leu Glu His Ala Gln Glu Gln Gln [SEQ ID NO:21];

25

Asn Cys Ser Ile Met Ile Asp Glu Ile Ile His His Leu
Lys Arg Pro Pro Ala Pro Leu Leu Asp Pro Asn Asn Leu Asn Ala
Glu Asp Val Asp Ile Leu Met Glu Arg Asn Leu Arg Leu Pro Asn
Leu Glu Ser Phe Val Arg Ala Val Lys Asn Leu Glu Asn Ala Ser
Ala Ile Glu Ser Ile Leu Lys Asn Leu Leu Pro Cys Leu Pro Leu
30 Ala Thr Ala Ala Pro Thr Arg His Pro Ile His Ile Lys Asp Gly
Asp Trp Asn Glu Phe Arg Arg Lys Leu Thr Phe Tyr Leu Lys Thr
Leu Glu Asn Ala Gln Ala Gln Gln [SEQ ID NO:22];

35

Asn Cys Ser Ile Met Ile Asp Glu Ile Ile His His Leu
Lys Arg Pro Pro Asn Pro Leu Leu Asp Pro Asn Asn Leu Asn Ser
Glu Asp Met Asp Ile Leu Met Glu Arg Asn Leu Arg Thr Pro Asn

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Leu Leu Ala Phe Val Arg Ala Val Lys His Leu Glu Asn Ala Ser
Ala Ile Glu Ser Ile Leu Lys Asn Leu Leu Pro Cys Leu Pro Leu
Ala Thr Ala Ala Pro Thr Arg His Pro Ile His Ile Lys Asp Gly
Asp Trp Asn Glu Phe Arg Arg Lys Leu Thr Phe Tyr Leu Lys Thr
5 Leu Glu Asn Ala Gln Ala Gln Gln [SEQ ID NO:23];

Asn Cys Ser Ile Met Ile Asp Glu Ile Ile His His Leu
Lys Val Pro Pro Ala Pro Leu Leu Asp Ser Asn Asn Leu Asn Ser
Glu Asp Met Asp Ile Leu Met Glu Arg Asn Leu Arg Leu Pro Asn
10 Leu Leu Ala Phe Val Arg Ala Val Lys Asn Leu Glu Asn Ala Ser
Ala Ile Glu Ser Ile Leu Lys Asn Leu Leu Pro Cys Leu Pro Leu
Ala Thr Ala Ala Pro Thr Arg His Pro Ile His Ile Lys Asp Gly
Asp Trp Asn Glu Phe Arg Arg Lys Leu Thr Phe Tyr Leu Lys Thr
Leu Glu Asn Ala Gln Ala Gln Gln [SEQ ID NO:24];

15 Met Ala Asn Cys Ser Asn Met Ile Asp Glu Ile Ile Thr His Leu
Lys Gln Pro Pro Leu Pro Leu Leu Asp Phe Asn Asn Leu Asn Gly
Glu Asp Gln Asp Ile Leu Met Glu Asn Asn Leu Arg Arg Pro Asn
Leu Glu Ala Phe Asn Arg Ala Val Lys Ser Leu Gln Asn Ala Ser
20 Gly Ile Glu Ala Ile Leu Arg Asn Leu Gln Pro Cys Leu Pro Ser
Ala Thr Ala Ala Pro Ser Arg His Pro Ile Ile Ile Lys Ala Gly
Asp Trp Gln Glu Phe Arg Glu Lys Leu Thr Phe Tyr Leu Val Thr
Leu Glu Gln Ala Gln Glu Gln Gln [SEQ ID NO:25];

25 Met Ala Asn Cys Ser Asn Met Ile Asp Glu Ile Ile Thr His Leu
Lys Gln Pro Pro Leu Pro Leu Leu Asp Phe Asn Asn Leu Asn Gly
Glu Asp Gln Asp Ile Leu Met Glu Asn Asn Leu Arg Arg Pro Asn
Leu Glu Ala Phe Asn Arg Ala Val Lys Ser Leu Gln Asn Ala Ser
Gly Ile Glu Ala Ile Leu Arg Asn Leu Val Pro Cys Leu Pro Ser
30 Ala Thr Ala Ala Pro Ser Arg His Pro Ile Thr Ile Lys Ala Gly
Asp Trp Gln Glu Phe Arg Glu Lys Leu Thr Phe Tyr Leu Val Thr
Leu Glu Gln Ala Gln Glu Gln Gln [SEQ ID NO:26];

Met Ala Asn Cys Ser Asn Met Ile Asp Glu Ile Ile Thr His Leu
35 Lys Gln Pro Pro Leu Pro Leu Leu Asp Phe Asn Asn Leu Asn Gly
Glu Asp Gln Asp Ile Leu Met Glu Asn Asn Leu Arg Arg Pro Asn

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Leu Glu Ala Phe Asn Arg Ala Val Lys Ser Leu Gln Asn Ala Ser
Gly Ile Glu Ala Ile Leu Arg Asn Leu Val Pro Cys Leu Pro Ser
Ala Thr Ala Ala Pro Ser Arg His Pro Ile Thr Ile Lys Ala Gly
Asp Trp Gln Glu Phe Arg Glu Lys Leu Thr Phe Tyr Leu Val Ser
5 Leu Glu His Ala Gln Glu Gln Gln [SEQ ID NO:27];

Met Ala Asn Cys Ser Ile Met Ile Asp Glu Ile Ile His His Leu
Lys Arg Pro Pro Ala Pro Leu Leu Asp Pro Asn Asn Leu Asn Ala
Glu Asp Val Asp Ile Leu Met Glu Arg Asn Leu Arg Leu Pro Asn
10 Leu Glu Ser Phe Val Arg Ala Val Lys Asn Leu Glu Asn Ala Ser
Ala Ile Glu Ser Ile Leu Lys Asn Leu Leu Pro Cys Leu Pro Leu
Ala Thr Ala Ala Pro Thr Arg His Pro Ile His Ile Lys Asp Gly
Asp Trp Asn Glu Phe Arg Arg Lys Leu Thr Phe Tyr Leu Lys Thr
Leu Glu Asn Ala Gln Ala Gln Gln [SEQ ID NO:28];

15 Met Ala Asn Cys Ser Ile Met Ile Asp Glu Ile Ile His His Leu
Lys Arg Pro Pro Asn Pro Leu Leu Asp Pro Asn Asn Leu Asn Ser
Glu Asp Met Asp Ile Leu Met Glu Arg Asn Leu Arg Thr Pro Asn
Leu Leu Ala Phe Val Arg Ala Val Lys His Leu Glu Asn Ala Ser
20 Ala Ile Glu Ser Ile Leu Lys Asn Leu Leu Pro Cys Leu Pro Leu
Ala Thr Ala Ala Pro Thr Arg His Pro Ile His Ile Lys Asp Gly
Asp Trp Asn Glu Phe Arg Arg Lys Leu Thr Phe Tyr Leu Lys Thr
Leu Glu Asn Ala Gln Ala Gln Gln [SEQ ID NO:29];

25 Met Ala Asn Cys Ser Ile Met Ile Asp Glu Ile Ile His His Leu
Lys Val Pro Pro Ala Pro Leu Leu Asp Ser Asn Asn Leu Asn Ser
Glu Asp Met Asp Ile Leu Met Glu Arg Asn Leu Arg Leu Pro Asn
Leu Leu Ala Phe Val Arg Ala Val Lys Asn Leu Glu Asn Ala Ser
Ala Ile Glu Ser Ile Leu Lys Asn Leu Leu Pro Cys Leu Pro Leu
30 Ala Thr Ala Ala Pro Thr Arg His Pro Ile His Ile Lys Asp Gly
Asp Trp Asn Glu Phe Arg Arg Lys Leu Thr Phe Tyr Leu Lys Thr
Leu Glu Asn Ala Gln Ala Gln Gln [SEQ ID NO:30];

Met Ala Asn Cys Ser Ile Met Ile Asp Glu Ile Ile His His Leu
35 Lys Arg Pro Pro Ala Pro Leu Leu Asp Pro Asn Asn Leu Asn Ala
Glu Asp Val Asp Ile Leu Met Glu Arg Asn Leu Arg Leu Pro Asn

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Leu Glu Ser Phe Val Arg Ala Val Lys Asn Leu Glu Asn Ala Ser
Gly Ile Glu Ala Ile Leu Arg Asn Leu Gln Pro Cys Leu Pro Ser
Ala Thr Ala Ala Pro Ser Arg His Pro Ile Ile Ile Lys Ala Gly
Asp Trp Gln Glu Phe Arg Glu Lys Leu Thr Phe Tyr Leu Val Thr
5 Leu Glu Gln Ala Gln Glu Gln Gln [SEQ ID NO:31];

Met Ala Asn Cys Ser Ile Met Ile Asp Glu Ile Ile His His Leu
Lys Arg Pro Pro Asn Pro Leu Leu Asp Pro Asn Asn Leu Asn Ser
Glu Asp Met Asp Ile Leu Met Glu Arg Asn Leu Arg Thr Pro Asn
10 Leu Leu Ala Phe Val Arg Ala Val Lys His Leu Glu Asn Ala Ser
Gly Ile Glu Ala Ile Leu Arg Asn Leu Gln Pro Cys Leu Pro Ser
Ala Thr Ala Ala Pro Ser Arg His Pro Ile Ile Ile Lys Ala Gly
Asp Trp Gln Glu Phe Arg Glu Lys Leu Thr Phe Tyr Leu Val Thr
Leu Glu Gln Ala Gln Glu Gln Gln [SEQ ID NO:32];

15 Met Ala Asn Cys Ser Ile Met Ile Asp Glu Ile Ile His His Leu
Lys Val Pro Pro Ala Pro Leu Leu Asp Ser Asn Asn Leu Asn Ser
Glu Asp Met Asp Ile Leu Met Glu Arg Asn Leu Arg Leu Pro Asn
Leu Leu Ala Phe Val Arg Ala Val Lys Asn Leu Glu Asn Ala Ser
20 Gly Ile Glu Ala Ile Leu Arg Asn Leu Gln Pro Cys Leu Pro Ser
Ala Thr Ala Ala Pro Ser Arg His Pro Ile Ile Ile Lys Ala Gly
Asp Trp Gln Glu Phe Arg Glu Lys Leu Thr Phe Tyr Leu Val Thr
Leu Glu Gln Ala Gln Glu Gln Gln [SEQ ID NO:33];

25 Met Ala Asn Cys Ser Ile Met Ile Asp Glu Ile Ile His His Leu
Lys Arg Pro Pro Ala Pro Leu Leu Asp Pro Asn Asn Leu Asn Ala
Glu Asp Val Asp Ile Leu Met Glu Arg Asn Leu Arg Leu Pro Asn
Leu Glu Ser Phe Val Arg Ala Val Lys Asn Leu Glu Asn Ala Ser
Gly Ile Glu Ala Ile Leu Arg Asn Leu Val Pro Cys Leu Pro Ser
30 Ala Thr Ala Ala Pro Ser Arg His Pro Ile Thr Ile Lys Ala Gly
Asp Trp Gln Glu Phe Arg Glu Lys Leu Thr Phe Tyr Leu Val Thr
Leu Glu Gln Ala Gln Glu Gln Gln [SEQ ID NO:34];

Met Ala Asn Cys Ser Ile Met Ile Asp Glu Ile Ile His His Leu
35 Lys Val Pro Pro Ala Pro Leu Leu Asp Ser Asn Asn Leu Asn Ser
Glu Asp Met Asp Ile Leu Met Glu Arg Asn Leu Arg Leu Pro Asn

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Leu Leu Ala Phe Val Arg Ala Val Lys Asn Leu Glu Asn Ala Ser
Gly Ile Glu Ala Ile Leu Arg Asn Leu Val Pro Cys Leu Pro Ser
Ala Thr Ala Ala Pro Ser Arg His Pro Ile Thr Ile Lys Ala Gly
Asp Trp Gln Glu Phe Arg Glu Lys Leu Thr Phe Tyr Leu Val Thr
5 Leu Glu Gln Ala Gln Glu Gln Gln [SEQ ID NO:35];

Met Ala Asn Cys Ser Ile Met Ile Asp Glu Ile Ile His His Leu
Lys Arg Pro Pro Asn Pro Leu Leu Asp Pro Asn Asn Leu Asn Ser
Glu Asp Met Asp Ile Leu Met Glu Arg Asn Leu Arg Thr Pro Asn
10 Leu Leu Ala Phe Val Arg Ala Val Lys His Leu Glu Asn Ala Ser
Gly Ile Glu Ala Ile Leu Arg Asn Leu Val Pro Cys Leu Pro Ser
Ala Thr Ala Ala Pro Ser Arg His Pro Ile Thr Ile Lys Ala Gly
Asp Trp Gln Glu Phe Arg Glu Lys Leu Thr Phe Tyr Leu Val Ser
Leu Glu His Ala Gln Glu Gln Gln [SEQ ID NO:36];

15 Met Ala Asn Cys Ser Ile Met Ile Asp Glu Ile Ile His His Leu
Lys Val Pro Pro Ala Pro Leu Leu Asp Ser Asn Asn Leu Asn Ser
Glu Asp Met Asp Ile Leu Met Glu Arg Asn Leu Arg Leu Pro Asn
Leu Leu Ala Phe Val Arg Ala Val Lys Asn Leu Glu Asn Ala Ser
20 Gly Ile Glu Ala Ile Leu Arg Asn Leu Val Pro Cys Leu Pro Ser
Ala Thr Ala Ala Pro Ser Arg His Pro Ile Thr Ile Lys Ala Gly
Asp Trp Gln Glu Phe Arg Glu Lys Leu Thr Phe Tyr Leu Val Ser
Leu Glu His Ala Gln Glu Gln Gln [SEQ ID NO:37];

25 Met Ala Asn Cys Ser Ile Met Ile Asp Glu Ile Ile His His Leu
Lys Arg Pro Pro Asn Pro Leu Leu Asp Pro Asn Asn Leu Asn Ser
Glu Asp Met Asp Ile Leu Met Glu Arg Asn Leu Arg Thr Pro Asn
Leu Leu Ala Phe Val Arg Ala Val Lys His Leu Glu Asn Ala Ser
Gly Ile Glu Ala Ile Leu Arg Asn Leu Val Pro Cys Leu Pro Ser
30 Ala Thr Ala Ala Pro Ser Arg His Pro Ile Thr Ile Lys Ala Gly
Asp Trp Gln Glu Phe Arg Glu Lys Leu Thr Phe Tyr Leu Val Thr
Leu Glu Gln Ala Gln Glu Gln Gln [SEQ ID NO:38];

Met Ala Asn Cys Ser Ile Met Ile Asp Glu Ile Ile His His Leu
35 Lys Arg Pro Pro Ala Pro Leu Leu Asp Pro Asn Asn Leu Asn Ala
Glu Asp Val Asp Ile Leu Met Glu Arg Asn Leu Arg Leu Pro Asn

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Leu Glu Ser Phe Val Arg Ala Val Lys Asn Leu Glu Asn Ala Ser
Gly Ile Glu Ala Ile Leu Arg Asn Leu Val Pro Cys Leu Pro Ser
Ala Thr Ala Ala Pro Ser Arg His Pro Ile Thr Ile Lys Ala Gly
Asp Trp Gln Glu Phe Arg Glu Lys Leu Thr Phe Tyr Leu Val Ser
5 Leu Glu His Ala Gln Glu Gln Gln [SEQ ID NO:39].

Met Ala Asn Cys Ser Ile Met Ile Asp Glu Ile Ile
His His Leu Lys Arg Pro Pro Ala Pro Leu Leu Asp
10 Pro Asn Asn Leu Asn Ala Glu Asp Val Asp Ile Leu Met Asp Arg
Asn Leu Arg Leu Ser Asn Leu Glu Ser Phe Val Arg Ala Val Lys
Asn Leu Glu Asn Ala Ser
Gly Ile Glu Ala Ile Leu Arg Asn Leu Gln Pro Cys Leu Pro Ser
Ala Thr Ala Ala Pro Ser Arg His Pro Ile Ile Ile Lys Ala Gly
15 Asp Trp Gln Glu Phe Arg Glu Lys Leu Thr Phe Tyr Leu Val Thr
Leu Glu Gln Ala Gln Glu Gln Gln [SEQ ID NO:40]

Met Ala Asn Cys Ser Ile Met Ile Asp Glu Ala Ile His His Leu
Lys Arg Pro Pro Ala Pro Ser Leu Asp Pro Asn Asn Leu Asn Asp
20 Glu Asp Met Ser Ile Leu Met Glu Arg Asn Leu Arg Leu Pro Asn
Leu Glu Ser Phe Val Arg Ala Val Lys Asn Leu Glu Asn Ala Ser
Gly Ile Glu Ala Ile Leu Arg Asn Leu Gln Pro Cys Leu Pro Ser
Ala Thr Ala Ala Pro Ser Arg His Pro Ile Ile Ile Lys Ala Gly
Asp Trp Gln Glu Phe Arg Glu Lys Leu Thr Phe Tyr Leu Val Thr
25 Leu Glu Gln Ala Gln Glu Gln Gln [SEQ ID NO:41]

Met Ala Asn Cys Ser Ile Met Ile Asp Glu Ile Ile His His Leu
Lys Arg Pro Pro Ala Pro Leu Leu Asp Pro Asn Asn Leu Asn Asp
Glu Asp Met Ser Ile Leu Met Glu Arg Asn Leu Arg Leu Pro Asn
30 Leu Glu Ser Phe Val Arg Ala Val Lys Asn Leu Glu Asn Ala Ser
Gly Ile Glu Ala Ile Leu Arg Asn Leu Gln Pro Cys Leu Pro Ser
Ala Thr Ala Ala Pro Ser Arg His Pro Ile Ile Ile Lys Ala Gly
Asp Trp Gln Glu Phe Arg Glu Lys Leu Thr Phe Tyr Leu Val Thr
Leu Glu Gln Ala Gln Glu Gln Gln [SEQ ID NO:42]

35

Met Ala Asn Cys Ser Ile Met Ile Asp Glu Ile Ile His His Leu
Lys Arg Pro Pro Ala Pro Leu Leu Asp Pro Asn Asn Leu Asn Ala

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Glu Asp Val Asp Ile Leu Met Asp Arg Asn Leu Arg Leu Pro Asn
Leu Glu Ser Phe Val Arg Ala Val Lys Asn Leu Glu Asn Ala Ser
Gly Ile Glu Ala Ile Leu Arg Asn Leu Gln Pro Cys Leu Pro Ser
Ala Thr Ala Ala Pro Ser Arg His Pro Ile Ile Ile Lys Ala Gly
5 Asp Trp Gln Glu Phe Arg Glu Lys Leu Thr Phe Tyr Leu Val Thr
Leu Glu Gln Ala Gln Glu Gln Gln [SEQ ID NO:43]

Met Ala Asn Cys Ser Ile Met Ile Asp Glu Ile Ile His His Leu
10 Lys Arg Pro Pro Ala Pro Leu Leu Asp Pro Asn Asn Leu Asn Asp
Glu Asp Val Ser Ile Leu Met Glu Arg Asn Leu Arg Leu Pro Asn
Leu Glu Ser Phe Val Arg Ala Val Lys Asn Leu Glu Asn Ala Ser
Gly Ile Glu Ala Ile Leu Arg Asn Leu Gln Pro Cys Leu Pro Ser
Ala Thr Ala Ala Pro Ser Arg His Pro Ile Ile Ile Lys Ala Gly
15 Asp Trp Gln Glu Phe Arg Glu Lys Leu Thr Phe Tyr Leu Val Thr
Leu Glu Gln Ala Gln Glu Gln Gln [SEQ ID NO:44]

Met Ala Asn Cys Ser Ile Met Ile Asp Glu Ile Ile His His Leu
20 Lys Arg Pro Pro Ala Pro Leu Leu Asp Pro Asn Asn Leu Asn Asp
Glu Asp Met Ser Ile Leu Met Glu Arg Asn Leu Arg Leu Pro Asn
Leu Glu Ser Phe Val Arg Ala Val Lys Asn Leu Glu Asn Ala Ser
Gly Ile Glu Ala Ile Leu Arg Asn Leu Gln Pro Cys Leu Pro Ser
Ala Thr Ala Ala Pro Ser Arg His Pro Ile Ile Ile Lys Ala Gly
25 Asp Trp Gln Glu Phe Arg Glu Lys Leu Thr Phe Tyr Leu Val Thr
Leu Glu Gln Ala Gln Glu Gln Gln [SEQ ID NO:45]

Met Ala Tyr Pro Glu Thr Asp Tyr Lys Asp Asp Asp Lys Asn
Cys Ser Ile Met Ile Asp Glu Ile Ile His His Leu Lys Arg Pro
30 Pro Ala Pro Leu Leu Asp Pro Asn Asn Leu Asn Ala Glu Asp Val
Asp Ile Leu Met Glu Arg Asn Leu Arg Leu Pro Asn Leu Glu Ser
Phe Val Arg Ala Val Lys Asn Leu Glu Asn Ala Ser Gly Ile Glu
Ala Ile Leu Arg Asn Leu Gln Pro Cys Leu Pro Ser Ala Thr Ala
Ala Pro Ser Arg His Pro Ile Ile Ile Lys Ala Gly Asp Trp Gln
35 Glu Phe Arg Glu Lys Leu Thr Phe Tyr Leu Val Thr Leu Glu Gln
Ala Gln Glu Gln Gln [SEQ ID NO:46]and

Met Ala Tyr Pro Glu Thr Asp Tyr Lys Asp Asp Asp Asp Lys Asn
 Cys Ser Ile Met Ile Asp Glu Ile Ile His His Leu Lys Arg Pro
 5 Pro Asn Pro Leu Leu Asp Pro Asn Asn Leu Asn Ser Glu Asp Met
 Asp Ile Leu Met Glu Arg Asn Leu Arg Thr Pro Asn Leu Leu Ala
 Phe Val Arg Ala Val Lys His Leu Glu Asn Ala Ser Gly Ile Glu
 Ala Ile Leu Arg Asn Leu Gln Pro Cys Leu Pro Ser Ala Thr Ala
 Ala Pro Ser Arg His Pro Ile Ile Ile Lys Ala Gly Asp Trp Gln
 10 Glu Phe Arg Glu Lys Leu Thr Phe Tyr Leu Val Thr Leu Glu Gln
 Ala Gln Glu Gln Gln [SEQ ID NO:47].

12. The composition of claim 10, wherein said human
 interleukin-3 mutant polypeptide is of the Formula:

15

Met Ala Asn Cys Ser Ile Met Ile Asp Glu Leu Ile His His Leu
 Lys Ile Pro Pro Asn Pro Ser Leu Asp Ser Ala Asn Leu Asn Ser
 Glu Asp Val Ser Ile Leu Met Glu Arg Asn Leu Arg Thr Pro Asn
 Leu Leu Ala Phe Val Arg Ala Val Lys His Leu Glu Asn Ala Ser
 20 Gly Ile Glu Ala Ile Leu Arg Asn Leu Gln Pro Cys Leu Pro Ser
 Ala Thr Ala Ala Pro Ser Arg His Pro Ile Ile Ile Lys Ala Gly
 Asp Trp Gln Glu Phe Arg Glu Lys Leu Thr Phe Tyr Leu Val Thr
 Leu Glu Gln Ala Gln Glu Gln Gln [SEQ ID NO:48].

25

13. The composition of claim 1-12 wherein said CSF is
 selected from the group consisting of G-CSF , Meg-CSF and GM-CSF:

14. A method of increasing multi-lineage
 30 hematopoietic cell production in a mammal in need thereof
 comprising administering a pharmaceutically effective
 amount of a human interleukin-3 mutant polypeptide of the
 Formula:

35 Ala Pro Met Thr Gln Thr Thr Ser Leu Lys Thr Ser Trp Val Asn
 1 5 10 15

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Cys Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa
 20 25 30
 5 Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Asn Xaa Xaa Xaa Xaa Xaa Xaa
 35 40 45
 Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa
 50 55 60
 10 Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa
 65 70 75
 Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa
 15 80 85 90
 Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa
 95 100 105
 20 Xaa Phe Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa
 110 115 120
 Xaa Xaa Xaa Gln Gln Thr Thr Leu Ser Leu Ala Ile Phe
 125 130
 25 [SEQ IDNO:15]

wherein

Xaa at position 17 is Ser, Lys, Gly, Asp, Met, Gln, or Arg;

30 Xaa at position 18 is Asn, His, Leu, Ile, Phe, Arg, or Gln;

Xaa at position 19 is Met, Phe, Ile, Arg, Gly, Ala, or Cys;

Xaa at position 20 is Ile, Cys, Gln, Glu, Arg, Pro, or Ala;

35 Xaa at position 21 is Asp, Phe, Lys, Arg, Ala, Gly, Glu,

- Gln, Asn, Thr, Ser or Val;
Xaa at position 22 is Glu, Trp, Pro, Ser, Ala, His, Asp,
Asn, Gln, Leu, Val or Gly;
Xaa at position 23 is Ile, Val, Ala, Leu, Gly, Trp, Lys,
5 Phe, Leu, Ser, or Arg;
Xaa at position 24 is Ile, Gly, Val, Arg, Ser, Phe, or
Leu;
Xaa at position 25 is Thr, His, Gly, Gln, Arg, Pro, or
Ala;
10 Xaa at position 26 is His, Thr, Phe, Gly, Arg, Ala, or
Trp;
Xaa at position 27 is Leu, Gly, Arg, Thr, Ser, or Ala;
Xaa at position 28 is Lys, Arg, Leu, Gln, Gly, Pro, Val or
Trp;
15 Xaa at position 29 is Gln, Asn, Leu, Pro, Arg, or Val;
Xaa at position 30 is Pro, His, Thr, Gly, Asp, Gln, Ser,
Leu, or Lys;
Xaa at position 31 is Pro, Asp, Gly, Ala, Arg, Leu, or
Gln;
20 Xaa at position 32 is Leu, Val, Arg, Gln, Asn, Gly, Ala,
or Glu;
Xaa at position 33 is Pro, Leu, Gln, Ala, Thr, or Glu;
Xaa at position 34 is Leu, Val, Gly, Ser, Lys, Glu, Gln,
Thr, Arg, Ala, Phe, Ile or Met;
25 Xaa at position 35 is Leu, Ala, Gly, Asn, Pro, Gln, or
Val;
Xaa at position 36 is Asp, Leu, or Val;
Xaa at position 37 is Phe, Ser, Pro, Trp, or Ile;
Xaa at position 38 is Asn, or Ala;
30 Xaa at position 40 is Leu, Trp, or Arg;
Xaa at position 41 is Asn, Cys, Arg, Leu, His, Met, or
Pro;
Xaa at position 42 is Gly, Asp, Ser, Cys, Asn, Lys, Thr,
Leu, Val, Glu, Phe, Tyr, Ile, Met or Ala;
35 Xaa at position 43 is Glu, Asn, Tyr, Leu, Phe, Asp, Ala,
Cys, Gln, Arg, Thr, Gly or Ser;

- Xaa at position 44 is Asp, Ser, Leu, Arg, Lys, Thr, Met,
Trp, Glu, Asn, Gln, Ala or Pro;
- Xaa at position 45 is Gln, Pro, Phe, Val, Met, Leu, Thr,
Lys, Trp, Asp, Asn, Arg, Ser, Ala, Ile, Glu or His;
- 5 Xaa at position 46 is Asp, Phe, Ser, Thr, Cys, Glu, Asn,
Gln, Lys, His, Ala, Tyr, Ile, Val or Gly;
- Xaa at position 47 is Ile, Gly, Val, Ser, Arg, Pro, or
His;
- Xaa at position 48 is Leu, Ser, Cys, Arg, Ile, His, Phe,
10 Glu, Lys, Thr, Ala, Met, Val or Asn;
- Xaa at position 49 is Met, Arg, Ala, Gly, Pro, Asn, His,
or Asp;
- Xaa at position 50 is Glu, Leu, Thr, Asp, Tyr, Lys, Asn,
Ser, Ala, Ile, Val, His, Phe, Met or Gln;
- 15 Xaa at position 51 is Asn, Arg, Met, Pro, Ser, Thr, or
His;
- Xaa at position 52 is Asn, His, Arg, Leu, Gly, Ser, or
Thr;
- Xaa at position 53 is Leu, Thr, Ala, Gly, Glu, Pro, Lys,
20 Ser, or Met;
- Xaa at position 54 is Arg, Asp, Ile, Ser, Val, Thr, Gln,
Asn, Lys, His, Ala or Leu;
- Xaa at position 55 is Arg, Thr, Val, Ser, Leu, or Gly;
- Xaa at position 56 is Pro, Gly, Cys, Ser, Gln, Glu, Arg,
25 His, Thr, Ala, Tyr, Phe, Leu, Val or Lys;
- Xaa at position 57 is Asn or Gly;
- Xaa at position 58 is Leu, Ser, Asp, Arg, Gln, Val, or
Cys;
- Xaa at position 59 is Glu Tyr, His, Leu, Pro, or Arg;
- 30 Xaa at position 60 is Ala, Ser, Pro, Tyr, Asn, or Thr;
- Xaa at position 61 is Phe, Asn, Glu, Pro, Lys, Arg, or
Ser;
- Xaa at position 62 is Asn His, Val, Arg, Pro, Thr, Asp, or
Ile;
- 35 Xaa at position 63 is Arg, Tyr, Trp, Lys, Ser, His, Pro,
or Val;

- Xaa at position 64 is Ala, Asn, Pro, Ser, or Lys;
Xaa at position 65 is Val, Thr, Pro, His, Leu, Phe, or Ser;
Xaa at position 66 is Lys, Ile, Arg, Val, Asn, Glu, or Ser;
5 Xaa at position 67 is Ser, Ala, Phe, Val, Gly, Asn, Ile, Pro, or His;
Xaa at position 68 is Leu, Val, Trp, Ser, Ile, Phe, Thr, or His;
10 Xaa at position 69 is Gln, Ala, Pro, Thr, Glu, Arg, Trp, Gly, or Leu;
Xaa at position 70 is Asn, Leu, Val, Trp, Pro, or Ala;
Xaa at position 71 is Ala, Met, Leu, Pro, Arg, Glu, Thr, Gln, Trp, or Asn;
15 Xaa at position 72 is Ser, Glu, Met, Ala, His, Asn, Arg, or Asp;
Xaa at position 73 is Ala, Glu, Asp, Leu, Ser, Gly, Thr, or Arg;
Xaa at position 74 is Ile, Met, Thr, Pro, Arg, Gly, Ala;
20 Xaa at position 75 is Glu, Lys, Gly, Asp, Pro, Trp, Arg, Ser, Gln, or Leu;
Xaa at position 76 is Ser, Val, Ala, Asn, Trp, Glu, Pro, Gly, or Asp;
Xaa at position 77 is Ile, Ser, Arg, Thr, or Leu;
25 Xaa at position 78 is Leu, Ala, Ser, Glu, Phe, Gly, or Arg;
Xaa at position 79 is Lys, Thr, Asn, Met, Arg, Ile, Gly, or Asp;
Xaa at position 80 is Asn, Trp, Val, Gly, Thr, Leu, Glu, or Arg;
30 Xaa at position 81 is Leu, Gln, Gly, Ala, Trp, Arg, Val, or Lys;
Xaa at position 82 is Leu, Gln, Lys, Trp, Arg, Asp, Glu, Asn, His, Thr, Ser, Ala, Tyr, Phe, Ile, Met or Val;
35 Xaa at position 83 is Pro, Ala, Thr, Trp, Arg, or Met;
Xaa at position 84 is Cys, Glu, Gly, Arg, Met, or Val;

Xaa at position 85 is Leu, Asn, Val, or Gln;
Xaa at position 86 is Pro, Cys, Arg, Ala, or Lys;
Xaa at position 87 is Leu, Ser, Trp, or Gly;
Xaa at position 88 is Ala, Lys, Arg, Val, or Trp;
5 Xaa at position 89 is Thr, Asp, Cys, Leu, Val, Glu, His,
Asn, or Ser;
Xaa at position 90 is Ala, Pro, Ser, Thr, Gly, Asp, Ile,
or Met;
Xaa at position 91 is Ala, Pro, Ser, Thr, Phe, Leu, Asp,
10 or His;
Xaa at position 92 is Pro, Phe, Arg, Ser, Lys, His, Ala,
Gly, Ile or Leu;
Xaa at position 93 is Thr, Asp, Ser, Asn, Pro, Ala, Leu,
or Arg;
15 Xaa at position 94 is Arg, Ile, Ser, Glu, Leu, Val, Gln,
Lys, His, Ala, or Pro;
Xaa at position 95 is His, Gln, Pro, Arg, Val, Leu, Gly,
Thr, Asn, Lys, Ser, Ala, Trp, Phe, Ile, or Tyr;
Xaa at position 96 is Pro, Lys, Tyr, Gly, Ile, or Thr;
20 Xaa at position 97 is Ile, Val, Lys, Ala, or Asn;
Xaa at position 98 is His, Ile, Asn, Leu, Asp, Ala, Thr,
Glu, Gln, Ser, Phe, Met, Val, Lys, Arg, Tyr or Pro;
Xaa at position 99 is Ile, Leu, Arg, Asp, Val, Pro, Gln,
Gly, Ser, Phe, or His;
25 Xaa at position 100 is Lys, Tyr, Leu, His, Arg, Ile, Ser,
Gln, or Pro;
Xaa at position 101 is Asp, Pro, Met, Lys, His, Thr, Val,
Tyr, Glu, Asn, Ser, Ala, Gly, Ile, Leu, or Gln;
Xaa at position 102 is Gly, Leu, Glu, Lys, Ser, Tyr, or
30 Pro;
Xaa at position 103 is Asp, or Ser;
Xaa at position 104 is Trp, Val, Cys, Tyr, Thr, Met, Pro,
Leu, Gln, Lys, Ala, Phe, or Gly;
Xaa at position 105 is Asn, Pro, Ala, Phe, Ser, Trp, Gln,
35 Tyr, Leu, Lys, Ile, Asp, or His;
Xaa at position 106 is Glu, Ser, Ala, Lys, Thr, Ile, Gly,

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- or Pro;
- Xaa at position 108 is Arg, Lys, Asp, Leu, Thr, Ile, Gln,
His, Ser, Ala or Pro;
- Xaa at position 109 is Arg, Thr, Pro, Glu, Tyr, Leu, Ser,
5 or Gly;
- Xaa at position 110 is Lys, Ala, Asn, Thr, Leu, Arg, Gln,
His, Glu, Ser, Ala, or Trp;
- Xaa at position 111 is Leu, Ile, Arg, Asp, or Met;
- Xaa at position 112 is Thr, Val, Gln, Tyr, Glu, His, Ser,
10 or Phe;
- Xaa at position 113 is Phe, Ser, Cys, His, Gly, Trp, Tyr,
Asp, Lys, Leu, Ile, Val or Asn;
- Xaa at position 114 is Tyr, Cys, His, Ser, Trp, Arg, or
Leu;
- 15 Xaa at position 115 is Leu, Asn, Val, Pro, Arg, Ala, His,
Thr, Trp, or Met;
- Xaa at position 116 is Lys, Leu, Pro, Thr, Met, Asp, Val,
Glu, Arg, Trp, Ser, Asn, His, Ala, Tyr, Phe, Gln, or
Ile;
- 20 Xaa at position 117 is Thr, Ser, Asn, Ile, Trp, Lys, or
Pro;
- Xaa at position 118 is Leu, Ser, Pro, Ala, Glu, Cys, Asp,
or Tyr;
- Xaa at position 119 is Glu, Ser, Lys, Pro, Leu, Thr, Tyr,
25 or Arg;
- Xaa at position 120 is Asn, Ala, Pro, Leu, His, Val, or
Gln;
- Xaa at position 121 is Ala, Ser, Ile, Asn, Pro, Lys, Asp,
or Gly;
- 30 Xaa at position 122 is Gln, Ser, Met, Trp, Arg, Phe, Pro,
His, Ile, Tyr, or Cys;
- Xaa at position 123 is Ala, Met, Glu, His, Ser, Pro, Tyr,
or Leu;
- 35 and which can additionally have Met- preceding the amino
acid in position 1; and wherein from 1 to 14 amino acids

can be deleted from the N-terminus and/or from 1 to 15 amino acids can be deleted from the C-terminus; and wherein from 4 to 44 of the amino acids designated by Xaa are different from the corresponding amino acids of native (1-133) human interleukin-3; and

a colony stimulating factor selected from the group consisting of GM-CSF, CSF-1, G-CSF, Meg-CSF (more recently referred to as c-mpl ligand), M-CSF, erythropoietin (EPO), IL-1, IL-4, IL-2, IL-5, IL-6, IL-7, IL-8, IL-9, IL-10, IL-11, IL-12, IL-13, LIF, flt3/flk2, human growth hormone, B-cell growth factor, B-cell differentiation factor, eosinophil differentiation factor and stem cell factor (SCF).

15. A method of increasing multi-lineage hematopoietic cell production in a mammal in need thereof comprising administering a pharmaceutically effective amount of human interleukin-3 mutant polypeptide of the Formula:

Ala	Pro	Met	Thr	Gln	Thr	Thr	Ser	Leu	Lys	Thr	Ser	Trp	Val	Asn
1				5					10					15
Cys	Xaa	Xaa	Xaa	Ile	Xaa	Glu	Xaa	Xaa	Xaa	Xaa	Leu	Lys	Xaa	Xaa
				20					25					30
Xaa	Xaa	Xaa	Xaa	Xaa	Asp	Xaa	Xaa	Asn	Leu	Asn	Xaa	Glu	Xaa	Xaa
				35					40					45
Xaa	Ile	Leu	Met	Xaa	Xaa	Asn	Leu	Xaa	Xaa	Xaa	Asn	Leu	Glu	Xaa
				50					55					60
Phe	Xaa	Xaa	Xaa	Xaa	Xaa	Xaa	Xaa	Xaa	Asn	Xaa	Xaa	Xaa	Ile	Glu
				65					70					75
Xaa	Xaa	Leu	Xaa	Xaa	Leu	Xaa	Xaa	Cys	Xaa	Pro	Xaa	Xaa	Thr	Ala

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	80	85	90
	Xaa Pro Xaa Arg Xaa Xaa Xaa Xaa Xaa Xaa Xaa Gly Asp Xaa Xaa		
	95	100	105
5	Xaa Phe Xaa Xaa Lys Leu Xaa Phe Xaa Xaa Xaa Xaa Leu Glu Xaa		
	110	115	120
	Xaa Xaa Xaa Gln Gln Thr Thr Leu Ser Leu Ala Ile Phe		
10	125	130	
	[SEQ ID NO:2]		

wherein

- Xaa at position 17 is Ser, Gly, Asp, Met, or Gln;
- 15 Xaa at position 18 is Asn, His, or Ile;
- Xaa at position 19 is Met or Ile;
- Xaa at position 21 is Asp or Glu;
- Xaa at position 23 is Ile, Ala, Leu, or Gly;
- Xaa at position 24 is Ile, Val, or Leu;
- 20 Xaa at position 25 is Thr, His, Gln, or Ala;
- Xaa at position 26 is His or Ala;
- Xaa at position 29 is Gln, Asn, or Val;
- Xaa at position 30 is Pro, Gly, or Gln;
- Xaa at position 31 is Pro, Asp, Gly, or Gln;
- 25 Xaa at position 32 is Leu, Arg, Gln, Asn, Gly, Ala, or Glu;
- Xaa at position 33 is Pro or Glu;
- Xaa at position 34 is Leu, Val, Gly, Ser, Lys, Ala, Arg, Gln, Glu, Ile, Phe, Thr or Met;
- 30 Xaa at position 35 is Leu, Ala, Asn, Pro, Gln, or Val;
- Xaa at position 37 is Phe, Ser, Pro, or Trp;
- Xaa at position 38 is Asn or Ala;
- Xaa at position 42 is Gly, Asp, Ser, Cys, Ala, Asn, Ile, Leu, Met, Tyr or Arg;
- 35 Xaa at position 44 is Asp or Glu;
- Xaa at position 45 is Gln, Val, Met, Leu, Thr, Ala, Asn,

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- Glu, Ser or Lys;
- Xaa at position 46 is Asp, Phe, Ser, Thr, Ala, Asn Gln,
Glu, His, Ile, Lys, Tyr, Val or Cys;
- Xaa at position 50 is Glu, Ala, Asn, Ser or Asp;
- 5 Xaa at position 51 is Asn, Arg, Met, Pro, Ser, Thr, or
His;
- Xaa at position 54 is Arg or Ala;
- Xaa at position 55 is Arg, Thr, Val, Leu, or Gly;
- Xaa at position 56 is Pro, Gly, Ser, Gln, Ala, Arg, Asn,
- 10 Glu, Leu, Thr, Val or Lys;
- Xaa at position 60 is Ala or Ser;
- Xaa at position 62 is Asn, Pro, Thr, or Ile;
- Xaa at position 63 is Arg or Lys;
- Xaa at position 64 is Ala or Asn;
- 15 Xaa at position 65 is Val or Thr;
- Xaa at position 66 is Lys or Arg;
- Xaa at position 67 is Ser, Phe, or His;
- Xaa at position 68 is Leu, Ile, Phe, or His;
- Xaa at position 69 is Gln, Ala, Pro, Thr, Glu, Arg, or
- 20 Gly;
- Xaa at position 71 is Ala, Pro, or Arg;
- Xaa at position 72 is Ser, Glu, Arg, or Asp;
- Xaa at position 73 is Ala or Leu;
- Xaa at position 76 is Ser, Val, Ala, Asn, Glu, Pro, or
- 25 Gly;
- Xaa at position 77 is Ile or Leu;
- Xaa at position 79 is Lys, Thr, Gly, Asn, Met, Arg, Ile,
Gly, or Asp;
- Xaa at position 80 is Asn, Gly, Glu, or Arg;
- 30 Xaa at position 82 is Leu, Gln, Trp, Arg, Asp, Ala, Asn,
Glu, His, Ile, Met, Phe, Ser, Thr, Tyr or Val;
- Xaa at position 83 is Pro or Thr;
- Xaa at position 85 is Leu or Val;
- Xaa at position 87 is Leu or Ser;
- 35 Xaa at position 88 is Ala or Trp;
- Xaa at position 91 is Ala or Pro;

- Xaa at position 93 is Thr, Asp, Ser, Pro, Ala, Leu, or Arg;
- Xaa at position 95 is His, Pro, Arg, Val, Leu, Gly, Asn, Phe, Ser or Thr;
- 5 Xaa at position 96 is Pro or Tyr;
Xaa at position 97 is Ile or Val;
Xaa at position 98 is His, Ile, Asn, Leu, Ala, Thr, Leu, Arg, Gln, Leu, Lys, Met, Ser, Tyr, Val or Pro;
Xaa at position 99 is Ile, Leu, or Val;
- 10 Xaa at position 100 is Lys, Arg, Ile, Gln, Pro, or Ser;
Xaa at position 101 is Asp, Pro, Met, Lys, His, Thr, Pro, Asn, Ile, Leu or Tyr;
Xaa at position 104 is Trp or Leu;
Xaa at position 105 is Asn, Pro, Ala, Ser, Trp, Gln, Tyr, Leu, Lys, Ile, Asp, or His;
- 15 Xaa at position 106 is Glu or Gly;
Xaa at position 108 is Arg, Ala, or Ser;
Xaa at position 109 is Arg, Thr, Glu, Leu, or Ser;
Xaa at position 112 is Thr, Val, or Gln;
- 20 Xaa at position 114 is Tyr or Trp;
Xaa at position 115 is Leu or Ala;
Xaa at position 116 is Lys, Thr, Val, Trp, Ser, Ala, His, Met, Phe, Tyr or Ile;
Xaa at position 117 is Thr or Ser;
- 25 Xaa at position 120 is Asn, Pro, Leu, His, Val, or Gln;
Xaa at position 121 is Ala, Ser, Ile, Asn, Pro, Asp, or Gly;
Xaa at position 122 is Gln, Ser, Met, Trp, Arg, Phe, Pro, His, Ile, Tyr, or Cys;
- 30 Xaa at position 123 is Ala, Met, Glu, His, Ser, Pro, Tyr, or Leu;

and which can additionally have Met- preceding the amino acid in position 1; and wherein from 1 to 14 amino acids

35 can be deleted from the N-terminus and/or from 1 to 15 amino acids can be deleted from the C-terminus; and wherein

from 4 to 35 of the amino acids designated by Xaa are different from the corresponding amino acids of native (1-133)human interleukin-3; and

5 A pharmaceutically effective amount of a colony stimulating factor.

16. The method of claim 15, wherein said human interleukin-3 mutant polypeptide is of the Formula:

10

Ala Pro Met Thr Gln Thr Thr Ser Leu Lys Thr Ser Trp Val Asn
1 5 10 15

15

Cys Xaa Xaa Met Ile Asp Glu Xaa Ile Xaa Xaa Leu Lys Xaa Xaa
20 25 30

Pro Xaa Pro Xaa Xaa Asp Phe Xaa Asn Leu Asn Xaa Glu Asp Xaa
35 40 45

20

Xaa Ile Leu Met Xaa Xaa Asn Leu Arg Xaa Xaa Asn Leu Glu Ala
50 55 60

Phe Xaa Arg Xaa Xaa Lys Xaa Xaa Xaa Asn Ala Ser Ala Ile Glu
65 70 75

25

Xaa Xaa Leu Xaa Xaa Leu Xaa Pro Cys Leu Pro Xaa Xaa Thr Ala
80 85 90

30

Xaa Pro Xaa Arg Xaa Pro Ile Xaa Xaa Xaa Xaa Gly Asp Trp Xaa
95 100 105

Glu Phe Xaa Xaa Lys Leu Xaa Phe Tyr Leu Xaa Xaa Leu Glu Xaa
110 115 120

35

Xaa Xaa Xaa Gln Gln Thr Thr Leu Ser Leu Ala Ile Phe
125 130

[SEQ ID NO:3]

wherein

- Xaa at position 17 is Ser, Gly, Asp, or Gln;
Xaa at position 18 is Asn, His, or Ile;
5 Xaa at position 23 is Ile, Ala, Leu, or Gly;
Xaa at position 25 is Thr, His, or Gln;
Xaa at position 26 is His or Ala;
Xaa at position 29 is Gln or Asn;
Xaa at position 30 is Pro or Gly;
10 Xaa at position 32 is Leu, Arg, Asn, or Ala;
Xaa at position 34 is Leu, Val, Ser, Ala, Arg, Gln, Glu,
Ile, Phe, Thr, or Met;
Xaa at position 35 is Leu, Ala, Asn, or Pro;
Xaa at position 38 is Asn or Ala;
15 Xaa at position 42 is Gly, Asp, Ser, Ala, Asn, Ile, Leu,
Met, Tyr or Arg;
Xaa at position 45 is Gln, Val, Met, Leu, Ala, Asn, Glu,
or Lys;
Xaa at position 46 is Asp, Phe, Ser, Gln, Glu, His, Val
20 or Thr;
Xaa at position 50 is Glu, Asn, Ser or Asp;
Xaa at position 51 is Asn, Arg, Pro, Thr, or His;
Xaa at position 55 is Arg, Leu, or Gly;
Xaa at position 56 is Pro, Gly, Ser, Ala, Asn, Val, Leu or
25 Gln;
Xaa at position 62 is Asn, Pro, or Thr;
Xaa at position 64 is Ala or Asn;
Xaa at position 65 is Val or Thr;
Xaa at position 67 is Ser or Phe;
30 Xaa at position 68 is Leu or Phe;
Xaa at position 69 is Gln, Ala, Glu, or Arg;
Xaa at position 76 is Ser, Val, Asn, Pro, or Gly;
Xaa at position 77 is Ile or Leu;
Xaa at position 79 is Lys, Gly, Asn, Met, Arg, Ile, or
35 Gly;
Xaa at position 80 is Asn, Gly, Glu, or Arg;

- Xaa at position 82 is Leu, Gln, Trp, Arg, Asp, Asn, Glu,
His, Met, Phe, Ser, Thr, Tyr or Val;
Xaa at position 87 is Leu or Ser;
Xaa at position 88 is Ala or Trp;
5 Xaa at position 91 is Ala or Pro;
Xaa at position 93 is Thr, Asp, or Ala;
Xaa at position 95 is His, Pro, Arg, Val, Gly, Asn, Ser or
Thr;
Xaa at position 98 is His, Ile, Asn, Ala, Thr, Gln, Glu,
10 Lys, Met, Ser, Tyr, Val or Leu;
Xaa at position 99 is Ile or Leu;
Xaa at position 100 is Lys or Arg;
Xaa at position 101 is Asp, Pro, Met, Lys, Thr, His, Pro,
Asn, Ile, Leu or Tyr;
15 Xaa at position 105 is Asn, Pro, Ser, Ile or Asp;
Xaa at position 108 is Arg, Ala, or Ser;
Xaa at position 109 is Arg, Thr, Glu, Leu, or Ser;
Xaa at position 112 is Thr or Gln;
Xaa at position 116 is Lys, Val, Trp, Ala, His, Phe, Tyr
20 or Ile;
Xaa at position 117 is Thr or Ser;
Xaa at position 120 is Asn, Pro, Leu, His, Val, or Gln;
Xaa at position 121 is Ala, Ser, Ile, Pro, or Asp;
Xaa at position 122 is Gln, Met, Trp, Phe, Pro, His, Ile,
25 or Tyr;
Xaa at position 123 is Ala, Met, Glu, Ser, or Leu;

- and which can additionally have Met- preceding the amino
acid in position 1; and wherein from 1 to 14 amino acids
30 can be deleted from the N-terminus and/or from 1 to 15
amino acids can be deleted from the C-terminus; and wherein
from 4 to 44 of the amino acids designated by Xaa are
different from the corresponding amino acids of native (1-
133)human interleukin-3: and
35 a colony stimulating factor selected from the group
consisting of GM-CSF, CSF-1, G-CSF, Meg-CSF (more recently

referred to as c-mpl ligand), M-CSF, erythropoietin (EPO), IL-1, IL-4, IL-2, IL-5, IL-6, IL-7, IL-8, IL-9, IL-10, IL-11, IL-12, IL-13, LIF, flt3/flk2, human growth hormone, B-cell growth factor, B-cell differentiation factor, eosinophil differentiation factor and stem cell factor (SCF).

17. The method of claim 16, wherein said human interleukin-3 mutant polypeptide is of the Formula:

Xaa at position 42 is Gly, Asp, Ser, Ile, Leu, Met, Tyr, or Ala;

Xaa at position 45 is Gln, Val, Met or Asn;

Xaa at position 46 is Asp, Ser, Gln, His or Val;

Xaa at position 50 is Glu or Asp;

Xaa at position 51 is Asn, Pro or Thr;

Xaa at position 62 is Asn or Pro;

Xaa at position 76 is Ser, or Pro;

Xaa at position 82 is Leu, Trp, Asp, Asn Glu, His, Phe, Ser or Tyr;

Xaa at position 95 is His, Arg, Thr, Asn or Ser;

Xaa at position 98 is His, Ile, Leu, Ala, Gln, Lys, Met, Ser, Tyr or Val;

Xaa at position 100 is Lys or Arg;

Xaa at position 101 is Asp, Pro, His, Asn, Ile or Leu;

Xaa at position 105 is Asn, or Pro;

Xaa at position 108 is Arg, Ala, or Ser;

Xaa at position 116 is Lys, Val, Trp, Ala, His, Phe, or Tyr;

Xaa at position 121 is Ala, or Ile;

Xaa at position 122 is Gln, or Ile; and

Xaa at position 123 is Ala, Met or Glu.

18. A method of increasing multi-lineage hematopoietic cell production in a mammal in need thereof comprising administering a pharmaceutically effective amount of a human interleukin-3 mutant

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polypeptide of the Formula:

Asn Cys Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa
 1 5 10 15
 5 Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Asn Xaa Xaa Xaa Xaa Xaa
 20 25 30
 Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa
 10 35 40 45
 Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa
 50 55 60
 15 Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa
 65 70 75
 Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa
 80 85 90
 20 Xaa Xaa Phe Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa
 95 100 105
 Xaa Xaa Xaa Xaa Gln Gln [SEQ ID NO:4]
 25 110

wherein

Xaa at position 3 is Ser, Lys, Gly, Asp, Met, Gln, or Arg;
 Xaa at position 4 is Asn, His, Leu, Ile, Phe, Arg, or Gln;
 30 Xaa at position 5 is Met, Phe, Ile, Arg, Gly, Ala, or Cys;
 Xaa at position 6 is Ile, Cys, Gln, Glu, Arg, Pro, or Ala;
 Xaa at position 7 is Asp, Phe, Lys, Arg, Ala, Gly, Glu,
 Gln, Asn, Thr, Ser or Val;
 Xaa at position 8 is Glu, Trp, Pro, Ser, Ala, His, Asp,
 35 Asn, Gln, Leu, Val, or Gly;
 Xaa at position 9 is Ile, Val, Ala, Leu, Gly, Trp, Lys,

Phe, Leu, Ser, or Arg;
Xaa at position 10 is Ile, Gly, Val, Arg, Ser, Phe, or
Leu;
Xaa at position 11 is Thr, His, Gly, Gln, Arg, Pro, or
5 Ala;
Xaa at position 12 is His, Thr, Phe, Gly, Arg, Ala, or
Trp;
Xaa at position 13 is Leu, Gly, Arg, Thr, Ser, or Ala;
Xaa at position 14 is Lys, Arg, Leu, Gln, Gly, Pro, Val or
10 Trp;
Xaa at position 15 is Gln, Asn, Leu, Pro, Arg, or Val;
Xaa at position 16 is Pro, His, Thr, Gly, Asp, Gln, Ser,
Leu, or Lys;
Xaa at position 17 is Pro, Asp, Gly, Ala, Arg, Leu, or
15 Gln;
Xaa at position 18 is Leu, Val, Arg, Gln, Asn, Gly, Ala,
or Glu;
Xaa at position 19 is Pro, Leu, Gln, Ala, Thr, or Glu;
Xaa at position 20 is Leu, Val, Gly, Ser, Lys, Glu, Gln,
20 Thr, Arg, Ala, Phe, Ile or Met;
Xaa at position 21 is Leu, Ala, Gly, Asn, Pro, Gln, or
Val;
Xaa at position 22 is Asp, Leu, or Val;
Xaa at position 23 is Phe, Ser, Pro, Trp, or Ile;
25 Xaa at position 24 is Asn, or Ala;
Xaa at position 26 is Leu, Trp, or Arg;
Xaa at position 27 is Asn, Cys, Arg, Leu, His, Met, Pro;
Xaa at position 28 is Gly, Asp, Ser, Cys, Ala, Lys, Asn,
Thr, Leu, Val, Glu, Phe, Tyr, Ile or Met;
30 Xaa at position 29 is Glu, Asn, Tyr, Leu, Phe, Asp, Ala,
Cys, Gln, Arg, Thr, Gly or Ser;
Xaa at position 30 is Asp, Ser, Leu, Arg, Lys, Thr, Met,
Trp, Glu, Asn, Gln, Ala or Pro;
Xaa at position 31 is Gln, Pro, Phe, Val, Met, Leu, Thr,
35 Lys, Asp, Asn, Arg, Ser, Ala, Ile, Glu, His or Trp;
Xaa at position 32 is Asp, Phe, Ser, Thr, Cys, Glu, Asn,

Gln, Lys, His, Ala, Tyr, Ile, Val or Gly;
Xaa at position 33 is Ile, Gly, Val, Ser, Arg, Pro, or
His;
Xaa at position 34 is Leu, Ser, Cys, Arg, Ile, His, Phe,
5 Glu, Lys, Thr, Ala, Met, Val or Asn;
Xaa at position 35 is Met, Arg, Ala, Gly, Pro, Asn, His,
or Asp;
Xaa at position 36 is Glu, Leu, Thr, Asp, Tyr, Lys, Asn,
Ser, Ala, Ile, Val, His, Phe, Met or Gln;
10 Xaa at position 37 is Asn, Arg, Met, Pro, Ser, Thr, or
His;
Xaa at position 38 is Asn, His, Arg, Leu, Gly, Ser, or
Thr;
Xaa at position 39 is Leu, Thr, Ala, Gly, Glu, Pro, Lys,
15 Ser, Met, or;
Xaa at position 40 is Arg, Asp, Ile, Ser, Val, Thr, Gln,
Asn, Lys, His, Ala or Leu;
Xaa at position 41 is Arg, Thr, Val, Ser, Leu, or Gly;
Xaa at position 42 is Pro, Gly, Cys, Ser, Gln, Glu, Arg,
20 His, Thr, Ala, Tyr, Phe, Leu, Val or Lys;
Xaa at position 43 is Asn or Gly;
Xaa at position 44 is Leu, Ser, Asp, Arg, Gln, Val, or
Cys;
Xaa at position 45 is Glu Tyr, His, Leu, Pro, or Arg;
25 Xaa at position 46 is Ala, Ser, Pro, Tyr, Asn, or Thr;
Xaa at position 47 is Phe, Asn, Glu, Pro, Lys, Arg, or
Ser;
Xaa at position 48 is Asn, His, Val, Arg, Pro, Thr, Asp,
or Ile;
30 Xaa at position 49 is Arg, Tyr, Trp, Lys, Ser, His, Pro,
or Val;
Xaa at position 50 is Ala, Asn, Pro, Ser, or Lys;
Xaa at position 51 is Val, Thr, Pro, His, Leu, Phe, or
Ser;
35 Xaa at position 52 is Lys, Ile, Arg, Val, Asn, Glu, or
Ser;

- Xaa at position 53 is Ser, Ala, Phe, Val, Gly, Asn, Ile,
Pro, or His;
- Xaa at position 54 is Leu, Val, Trp, Ser, Ile, Phe, Thr,
or His;
- 5 Xaa at position 55 is Gln, Ala, Pro, Thr, Glu, Arg, Trp,
Gly, or Leu;
- Xaa at position 56 is Asn, Leu, Val, Trp, Pro, or Ala;
- Xaa at position 57 is Ala, Met, Leu, Pro, Arg, Glu, Thr,
Gln, Trp, or Asn;
- 10 Xaa at position 58 is Ser, Glu, Met, Ala, His, Asn, Arg,
or Asp;
- Xaa at position 59 is Ala, Glu, Asp, Leu, Ser, Gly, Thr,
or Arg;
- Xaa at position 60 is Ile, Met, Thr, Pro, Arg, Gly, Ala;
- 15 Xaa at position 61 is Glu, Lys, Gly, Asp, Pro, Trp, Arg,
Ser, Gln, or Leu;
- Xaa at position 62 is Ser, Val, Ala, Asn, Trp, Glu, Pro,
Gly, or Asp;
- Xaa at position 63 is Ile, Ser, Arg, Thr, or Leu;
- 20 Xaa at position 64 is Leu, Ala, Ser, Glu, Phe, Gly, or
Arg;
- Xaa at position 65 is Lys, Thr, Gly, Asn, Met, Arg, Ile,
or Asp;
- Xaa at position 66 is Asn, Trp, Val, Gly, Thr, Leu, Glu,
or Arg;
- 25 Xaa at position 67 is Leu, Gln, Gly, Ala, Trp, Arg, Val,
or Lys;
- Xaa at position 68 is Leu, Gln, Lys, Trp, Arg, Asp, Glu,
Asn, His, Thr, Ser, Ala, Tyr, Phe, Ile, Met or Val;
- 30 Xaa at position 69 is Pro, Ala, Thr, Trp, Arg, or Met;
- Xaa at position 70 is Cys, Glu, Gly, Arg, Met, or Val;
- Xaa at position 71 is Leu, Asn, Val, or Gln;
- Xaa at position 72 is Pro, Cys, Arg, Ala, or Lys;
- Xaa at position 73 is Leu, Ser, Trp, or Gly;
- 35 Xaa at position 74 is Ala, Lys, Arg, Val, or Trp;
- Xaa at position 75 is Thr, Asp, Cys, Leu, Val, Glu, His,

- Asn, or Ser;
- Xaa at position 76 is Ala, Pro, Ser, Thr, Gly, Asp, Ile,
or Met;
- 5 Xaa at position 77 is Ala, Pro, Ser, Thr, Phe, Leu, Asp,
or His;
- Xaa at position 78 is Pro, Phe, Arg, Ser, Lys, His, Ala,
Gly, Ile or Leu;
- Xaa at position 79 is Thr, Asp, Ser, Asn, Pro, Ala, Leu,
or Arg;
- 10 Xaa at position 80 is Arg, Ile, Ser, Glu, Leu, Val, Gln,
Lys, His, Ala or Pro;
- Xaa at position 81 is His, Gln, Pro, Arg, Val, Leu, Gly,
Thr, Asn, Lys, Ser, Ala, Trp, Phe, Ile or Tyr;
- Xaa at position 82 is Pro, Lys, Tyr, Gly, Ile, or Thr;
- 15 Xaa at position 83 is Ile, Val, Lys, Ala, or Asn;
- Xaa at position 84 is His, Ile, Asn, Leu, Asp, Ala, Thr,
Glu, Gln, Ser, Phe, Met, Val, Lys, Arg, Tyr or Pro;
- Xaa at position 85 is Ile, Leu, Arg, Asp, Val, Pro, Gln,
Gly, Ser, Phe, or His;
- 20 Xaa at position 86 is Lys, Tyr, Leu, His, Arg, Ile, Ser,
Gln, Pro;
- Xaa at position 87 is Asp, Pro, Met, Lys, His, Thr, Val,
Tyr, Glu, Asn, Ser, Ala, Gly, Ile, Leu or Gln;
- Xaa at position 88 is Gly, Leu, Glu, Lys, Ser, Tyr, or
25 Pro;
- Xaa at position 89 is Asp, or Ser;
- Xaa at position 90 is Trp, Val, Cys, Tyr, Thr, Met, Pro,
Leu, Gln, Lys, Ala, Phe, or Gly;
- Xaa at position 91 is Asn, Pro, Ala, Phe, Ser, Trp, Gln,
30 Tyr, Leu, Lys, Ile, Asp, or His;
- Xaa at position 92 is Glu, Ser, Ala, Lys, Thr, Ile, Gly,
or Pro;
- Xaa at position 94 is Arg, Lys, Asp, Leu, Thr, Ile, Gln,
His, Ser, Ala, or Pro;
- 35 Xaa at position 95 is Arg, Thr, Pro, Glu, Tyr, Leu, Ser,
or Gly;

- Xaa at position 96 is Lys, Asn, Thr, Leu, Gln, Arg,
His, Glu, Ser, Ala or Trp;
Xaa at position 97 is Leu, Ile, Arg, Asp, or Met;
Xaa at position 98 is Thr, Val, Gln, Tyr, Glu, His, Ser,
5 or Phe;
Xaa at position 99 is Phe, Ser, Cys, His, Gly, Trp, Tyr,
Asp, Lys, Leu, Ile, Val or Asn;
Xaa at position 100 is Tyr, Cys, His, Ser, Trp, Arg, or
Leu;
10 Xaa at position 101 is Leu, Asn, Val, Pro, Arg, Ala, His,
Thr, Trp, or Met;
Xaa at position 102 is Lys, Leu, Pro, Thr, Met, Asp, Val,
Glu, Arg, Trp, Ser, Asn, His, Ala, Tyr, Phe, Gln, or
Ile;
15 Xaa at position 103 is Thr, Ser, Asn, Ile, Trp, Lys, or
Pro;
Xaa at position 104 is Leu, Ser, Pro, Ala, Glu, Cys, Asp,
or Tyr;
Xaa at position 105 is Glu, Ser, Lys, Pro, Leu, Thr, Tyr,
20 or Arg;
Xaa at position 106 is Asn, Ala, Pro, Leu, His, Val, or
Gln;
Xaa at position 107 is Ala, Ser, Ile, Asn, Pro, Lys, Asp,
or Gly;
25 Xaa at position 108 is Gln, Ser, Met, Trp, Arg, Phe, Pro,
His, Ile, Tyr, or Cys;
Xaa at position 109 is Ala, Met, Glu, His, Ser, Pro, Tyr,
or Leu;
- 30 and which can additionally have Met- or Met-Ala- preceding
the amino acid in position 1; and wherein from 4 to 44 of
the amino acids designated by Xaa are different from the
corresponding native amino acids of (1-133) human
interleukin-3; and
- 35 A pharmaceutically effective amount of a colony
stimulating factor.

19. The method of claim 18, wherein said human interleukin-3 mutant polypeptide is of the Formula:

5 Asn Cys Xaa Xaa Xaa Ile Xaa Glu Xaa Xaa Xaa Xaa Leu Lys Xaa
1 5 10 15
Xaa Xaa Xaa Xaa Xaa Xaa Asp Xaa Xaa Asn Leu Asn Xaa Glu Xaa
20 25 30
10 Xaa Xaa Ile Leu Met Xaa Xaa Asn Leu Xaa Xaa Xaa Asn Leu Glu
35 40 45
Xaa Phe Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Asn Xaa Xaa Xaa Ile
15 50 55 60
Glu Xaa Xaa Leu Xaa Xaa Leu Xaa Xaa Cys Xaa Pro Xaa Xaa Thr
65 70 75
20 Ala Xaa Pro Xaa Arg Xaa Xaa Xaa Xaa Xaa Xaa Gly Asp Xaa
80 85 90
Xaa Xaa Phe Xaa Xaa Lys Leu Xaa Phe Xaa Xaa Xaa Xaa Leu Glu
95 100 105
25 Xaa Xaa Xaa Xaa Gln Gln [SEQ ID NO:5]
110

wherein

- 30 Xaa at position 3 is Ser, Gly, Asp, Met, or Gln;
Xaa at position 4 is Asn, His, or Ile;
Xaa at position 5 is Met or Ile;
Xaa at position 7 is Asp or Glu;
Xaa at position 9 is Ile, Ala, Leu, or Gly;
35 Xaa at position 10 is Ile, Val, or Leu;
Xaa at position 11 is Thr, His, Gln, or Ala;

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- Xaa at position 12 is His or Ala;
Xaa at position 15 is Gln, Asn, or Val;
Xaa at position 16 is Pro, Gly, or Gln;
Xaa at position 17 is Pro, Asp, Gly, or Gln;
5 Xaa at position 18 is Leu, Arg, Gln, Asn, Gly, Ala, or
Glu;
Xaa at position 19 is Pro or Glu;
Xaa at position 20 is Leu, Val, Gly, Ser, Lys, Ala, Arg,
Gln, Glu, Ile, Phe, Thr or Met;
10 Xaa at position 21 is Leu, Ala, Asn, Pro, Gln, or Val;
Xaa at position 23 is Phe, Ser, Pro, or Trp;
Xaa at position 24 is Asn or Ala;
Xaa at position 28 is Gly, Asp, Ser, Cys, Ala, Asn, Ile,
Leu, Met Tyr or Arg;
15 Xaa at position 30 is Asp or Glu;
Xaa at position 31 is Gln, Val, Met, Leu, Thr, Ala, Asn,
Glu, Ser or Lys;
Xaa at position 32 is Asp, Phe, Ser, Thr, Ala, Asn, Gln,
Glu, His, Ile, Lys, Tyr, Val or Cys;
20 Xaa at position 36 is Glu, Ala, Asn, Ser or Asp;
Xaa at position 37 is Asn, Arg, Met, Pro, Ser, Thr, or
His;
Xaa at position 40 is Arg or Ala;
Xaa at position 41 is Arg, Thr, Val, Leu, or Gly;
25 Xaa at position 42 is Pro, Gly, Ser, Gln, Ala, Arg, Asn,
Glu, Leu, Thr, Val or Lys;
Xaa at position 46 is Ala or Ser;
Xaa at position 48 is Asn, Pro, Thr, or Ile;
Xaa at position 49 is Arg or Lys;
30 Xaa at position 50 is Ala or Asn;
Xaa at position 51 is Val or Thr;
Xaa at position 52 is Lys or Arg;
Xaa at position 53 is Ser, Phe, or His;
Xaa at position 54 is Leu, Ile, Phe, or His;
35 Xaa at position 55 is Gln, Ala, Pro, Thr, Glu, Arg, or
Gly;

Xaa at position 57 is Ala, Pro, or Arg;
Xaa at position 58 is Ser, Glu, Arg, or Asp;
Xaa at position 59 is Ala or Leu;
Xaa at position 62 is Ser, Val, Ala, Asn, Glu, Pro, or
5 Gly;
Xaa at position 63 is Ile or Leu;
Xaa at position 65 is Lys, Thr, Gly, Asn, Met, Arg, Ile,
Gly, or Asp;
Xaa at position 66 is Asn, Gly, Glu, or Arg;
10 Xaa at position 68 is Leu, Gln, Trp, Arg, Asp, Ala, Asn,
Glu, His, Ile, Met, Phe, Ser, Thr, Tyr or Val;
Xaa at position 69 is Pro or Thr;
Xaa at position 71 is Leu or Val;
Xaa at position 73 is Leu or Ser;
15 Xaa at position 74 is Ala or Trp;
Xaa at position 77 is Ala or Pro;
Xaa at position 79 is Thr, Asp, Ser, Pro, Ala, Leu, or
Arg;
Xaa at position 81 is His, Pro, Arg, Val, Leu, Gly, Asn,
20 Phe, Ser or Thr;
Xaa at position 82 is Pro or Tyr;
Xaa at position 83 is Ile or Val;
Xaa at position 84 is His, Ile, Asn, Leu, Ala, Thr, Leu,
Arg, Gln, Leu, Lys, Met, Ser, Tyr, Val or Pro;
25 Xaa at position 85 is Ile, Leu, or Val;
Xaa at position 86 is Lys, Arg, Ile, Gln, Pro, or Ser;
Xaa at position 87 is Asp, Pro, Met, Lys, His, Thr, Asn,
Ile, Leu or Tyr;
Xaa at position 90 is Trp or Leu;
30 Xaa at position 91 is Asn, Pro, Ala, Ser, Trp, Gln, Tyr,
Leu, Lys, Ile, Asp, or His;
Xaa at position 92 is Glu, or Gly;
Xaa at position 94 is Arg, Ala, or Ser;
Xaa at position 95 is Arg, Thr, Glu, Leu, or Ser;
35 Xaa at position 98 is Thr, Val, or Gln;
Xaa at position 100 is Tyr or Trp;

Xaa at position 101 is Leu or Ala;

Xaa at position 102 is Lys, Thr, Val, Trp, Ser, Ala, His,
Met, Phe, Tyr or Ile;

Xaa at position 103 is Thr or Ser;

5 Xaa at position 106 is Asn, Pro, Leu, His, Val, or Gln;

Xaa at position 107 is Ala, Ser, Ile, Asn, Pro, Asp, or
Gly;

Xaa at position 108 is Gln, Ser, Met, Trp, Arg, Phe, Pro,
His, Ile, Tyr, or Cys;

10 Xaa at position 109 is Ala, Met, Glu, His, Ser, Pro, Tyr,
or Leu;

which can additionally have Met- or Met-Ala- preceding the
amino acid in position 1; and wherein from 4 to 35 of the
15 amino acids designated by Xaa are different from the
corresponding amino acids of native human interleukin-3.

20. The method of claim 19, wherein said human
interleukin-3 mutant polypeptide is of the Formula:

20

Asn Cys Xaa Xaa Met Ile Asp Glu Xaa Ile Xaa Xaa Leu Lys Xaa
1 5 10 15

25

Xaa Pro Xaa Pro Xaa Xaa Asp Phe Xaa Asn Leu Asn Xaa Glu Asp
20 25 30

Xaa Xaa Ile Leu Met Xaa Xaa Asn Leu Arg Xaa Xaa Asn Leu Glu
35 40 45

30

Ala Phe Xaa Arg Xaa Xaa Lys Xaa Xaa Xaa Asn Ala Ser Ala Ile
50 55 60

Glu Xaa Xaa Leu Xaa Xaa Leu Xaa Pro Cys Leu Pro Xaa Xaa Thr
65 70 75

35

Ala Xaa Pro Xaa Arg Xaa Pro Ile Xaa Xaa Xaa Xaa Gly Asp Trp

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80 85 90

Xaa Glu Phe Xaa Xaa Lys Leu Xaa Phe Tyr Leu Xaa Xaa Leu Glu
95 100 105

5 Xaa Xaa Xaa Xaa Gln Gln [SEQ ID NO:6]
110

wherein

Xaa at position 3 is Ser, Gly, Asp, or Gln;

10 Xaa at position 4 is Asn, His, or Ile;
Xaa at position 9 is Ile, Ala, Leu, or Gly;
Xaa at position 11 is Thr, His, or Gln;
Xaa at position 12 is His or Ala;
Xaa at position 15 is Gln or Asn;

15 Xaa at position 16 is Pro or Gly;
Xaa at position 18 is Leu, Arg, Asn, or Ala;
Xaa at position 20 is Leu, Val, Ser, Ala, Arg, Gln, Glu,
Ile, Phe, Thr or Met;
Xaa at position 21 is Leu, Ala, Asn, or Pro;

20 Xaa at position 24 is Asn or Ala;
Xaa at position 28 is Gly, Asp, Ser, Ala, Asn, Ile, Leu,
Met, Tyr or Arg;
Xaa at position 31 is Gln, Val, Met, Leu, Ala, Asn, Glu or
Lys;

25 Xaa at position 32 is Asp, Phe, Ser, Ala, Gln, Glu, His,
Val or Thr;
Xaa at position 36 is Glu, Asn, Ser or Asp;
Xaa at position 37 is Asn, Arg, Pro, Thr, or His;
Xaa at position 41 is Arg, Leu, or Gly;

30 Xaa at position 42 is Pro, Gly, Ser, Ala, Asn, Val, Leu or
Gln;
Xaa at position 48 is Asn, Pro, or Thr;
Xaa at position 50 is Ala or Asn;
Xaa at position 51 is Val or Thr;

35 Xaa at position 53 is Ser or Phe;
Xaa at position 54 is Leu or Phe;

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- Xaa at position 55 is Gln, Ala, Glu, or Arg;
Xaa at position 62 is Ser, Val, Asn, Pro, or Gly;
Xaa at position 63 is Ile or Leu;
Xaa at position 65 is Lys, Asn, Met, Arg, Ile, or Gly;
5 Xaa at position 66 is Asn, Gly, Glu, or Arg;
Xaa at position 68 is Leu, Gln, Trp, Arg, Asp, Asn, Glu,
His, Met, Phe, Ser, Thr, Tyr or Val;
Xaa at position 73 is Leu or Ser;
Xaa at position 74 is Ala or Trp;
10 Xaa at position 77 is Ala or Pro;
Xaa at position 79 is Thr, Asp, or Ala;
Xaa at position 81 is His, Pro, Arg, Val, Gly, Asn, Ser or
Thr;
Xaa at position 84 is His, Ile, Asn, Ala, Thr, Arg, Gln,
15 Glu, Lys, Met, Ser, Tyr, Val or Leu;
Xaa at position 85 is Ile or Leu;
Xaa at position 86 is Lys or Arg;
Xaa at position 87 is Asp, Pro, Met, Lys, His, Pro, Asn,
Ile, Leu or Tyr;
20 Xaa at position 91 is Asn, Pro, Ser, Ile or Asp;
Xaa at position 94 is Arg, Ala, or Ser;
Xaa at position 95 is Arg, Thr, Glu, Leu, or Ser;
Xaa at position 98 is Thr or Gln;
Xaa at position 102 is Lys, Val, Trp, or Ile;
25 Xaa at position 103 is Thr, Ala, His, Phe, Tyr or Ser;
Xaa at position 106 is Asn, Pro, Leu, His, Val, or Gln;
Xaa at position 107 is Ala, Ser, Ile, Pro, or Asp;
Xaa at position 108 is Gln, Met, Trp, Phe, Pro, His, Ile,
or Tyr;
30 Xaa at position 109 is Ala, Met, Glu, Ser, or Leu;

and which can additionally have Met- or Met-Ala- preceding
the amino acid in position 1; and wherein from 4 to 26 of
the amino acids designated by Xaa are different from the
35 corresponding amino acids of native (1-133)human
interleukin-3.

21. The method of claim 20, wherein said human interleukin-3 mutant polypeptide is of the Formula:

- 5 Xaa at position 17 is Ser, Lys, Asp, Met, Gln, or Arg;
Xaa at position 18 is Asn, His, Leu, Ile, Phe, Arg, or
Gln;
Xaa at position 19 is Met, Arg, Gly, Ala, or Cys;
Xaa at position 20 is Ile, Cys, Gln, Glu, Arg, Pro, or
10 Ala;
Xaa at position 21 is Asp, Phe, Lys, Arg, Ala, Gly, or
Val;
Xaa at position 22 is Glu, Trp, Pro, Ser, Ala, His, or
Gly;
15 Xaa at position 23 is Ile, Ala, Gly, Trp, Lys, Leu, Ser,
or Arg;
Xaa at position 24 is Ile, Gly, Arg, or Ser;
Xaa at position 25 is Thr, His, Gly, Gln, Arg, Pro, or
Ala;
20 Xaa at position 26 is His, Thr, Phe, Gly, Ala, or Trp;
Xaa at position 27 is Leu, Gly, Arg, Thr, Ser, or Ala;
Xaa at position 28 is Lys, Leu, Gln, Gly, Pro, Val or Trp;
Xaa at position 29 is Gln, Asn, Pro, Arg, or Val;
Xaa at position 30 is Pro, His, Thr, Gly, Asp, Gln, Ser,
25 Leu, or Lys;
Xaa at position 31 is Pro, Asp, Gly, Arg, Leu, or Gln;
Xaa at position 32 is Leu, Arg, Gln, Asn, Gly, Ala, or
Glu;
Xaa at position 33 is Pro, Leu, Gln, Thr, or Glu;
30 Xaa at position 34 is Leu, Gly, Ser, or Lys;
Xaa at position 35 is Leu, Ala, Gly, Asn, Pro, or Gln;
Xaa at position 36 is Asp, Leu, or Val;
Xaa at position 37 is Phe, Ser, or Pro;
Xaa at position 38 is Asn, or Ala;
35 Xaa at position 40 is Leu, Trp, or Arg;
Xaa at position 41 is Asn, Cys, Arg, Leu, His, Met, Pro;

Xaa at position 42 is Gly, Asp, Ser, Cys, or Ala;
Xaa at position 42 is Glu, Asn, Tyr, Leu, Phe, Asp, Ala,
Cys, or Ser;
Xaa at position 44 is Asp, Ser, Leu, Arg, Lys, Thr, Met,
5 Trp, or Pro;
Xaa at position 45 is Gln, Pro, Phe, Val, Met, Leu, Thr,
Lys, or Trp;
Xaa at position 46 is Asp, Phe, Ser, Thr, Cys, or Gly;
Xaa at position 47 is Ile, Gly, Ser, Arg, Pro, or His;
10 Xaa at position 48 is Leu, Ser, Cys, Arg, His, Phe, or
Asn;
Xaa at position 49 is Met, Arg, Ala, Gly, Pro, Asn, His,
or Asp;
Xaa at position 50 is Glu, Leu, Thr, Asp, or Tyr;
15 Xaa at position 51 is Asn, Arg, Met, Pro, Ser, Thr, or
His;
Xaa at position 52 is Asn, His, Arg, Leu, Gly, Ser, or
Thr;
Xaa at position 53 is Leu, Thr, Ala, Gly, Glu, Pro, Lys,
20 Ser, or;
Xaa at position 54 is Arg, Asp, Ile, Ser, Val, Thr, Gln,
or Leu;
Xaa at position 55 is Arg, Thr, Val, Ser, Leu, or Gly;
Xaa at position 56 is Pro, Gly, Cys, Ser, Gln, or Lys;
25 Xaa at position 57 is Asn or Gly;
Xaa at position 58 is Leu, Ser, Asp, Arg, Gln, Val, or
Cys;
Xaa at position 59 is Glu Tyr, His, Leu, Pro, or Arg;
Xaa at position 60 is Ala, Ser, Tyr, Asn, or Thr;
30 Xaa at position 61 is Phe, Asn, Glu, Pro, Lys, Arg, or
Ser;
Xaa at position 62 is Asn His, Val, Arg, Pro, Thr, or Ile;
Xaa at position 63 is Arg, Tyr, Trp, Ser, Pro, or Val;
Xaa at position 64 is Ala, Asn, Ser, or Lys;
35 Xaa at position 65 is Val, Thr, Pro, His, Leu, Phe, or
Ser;

- Xaa at position 66 is Lys, Ile, Val, Asn, Glu, or Ser;
Xaa at position 67 is Ser, Ala, Phe, Val, Gly, Asn, Ile,
Pro, or His;
Xaa at position 68 is Leu, Val, Trp, Ser, Thr, or His;
5 Xaa at position 69 is Gln, Ala, Pro, Thr, Arg, Trp, Gly,
or Leu;
Xaa at position 70 is Asn, Leu, Val, Trp, Pro, or Ala;
Xaa at position 71 is Ala, Met, Leu, Arg, Glu, Thr, Gln,
Trp, or Asn;
10 Xaa at position 72 is Ser, Glu, Met, Ala, His, Asn, Arg,
or Asp;
Xaa at position 73 is Ala, Glu, Asp, Leu, Ser, Gly, Thr,
or Arg;
Xaa at position 74 is Ile, Thr, Pro, Arg, Gly, Ala;
15 Xaa at position 75 is Glu, Lys, Gly, Asp, Pro, Trp, Arg,
Ser, or Leu;
Xaa at position 76 is Ser, Val, Ala, Asn, Trp, Glu, Pro,
Gly, or Asp;
Xaa at position 77 is Ile, Ser, Arg, or Thr;
20 Xaa at position 78 is Leu, Ala, Ser, Glu, Gly, or Arg;
Xaa at position 79 is Lys, Thr, Gly, Asn, Met, Ile, or
Asp;
Xaa at position 80 is Asn, Trp, Val, Gly, Thr, Leu, or
Arg;
25 Xaa at position 81 is Leu, Gln, Gly, Ala, Trp, Arg, or
Lys;
Xaa at position 82 is Leu, Gln, Lys, Trp, Arg, or Asp;
Xaa at position 83 is Pro, Thr, Trp, Arg, or Met;
Xaa at position 84 is Cys, Glu, Gly, Arg, Met, or Val;
30 Xaa at position 85 is Leu, Asn, or Gln;
Xaa at position 86 is Pro, Cys, Arg, Ala, or Lys;
Xaa at position 87 is Leu, Ser, Trp, or Gly;
Xaa at position 88 is Ala, Lys, Arg, Val, or Trp;
Xaa at position 89 is Thr, Asp, Cys, Leu, Val, Glu, His,
35 or Asn;
Xaa at position 90 is Ala, Ser, Asp, Ile, or Met;

- Xaa at position 91 is Ala, Ser, Thr, Phe, Leu, Asp, or His;
- Xaa at position 92 is Pro, Phe, Arg, Ser, Lys, His, or Leu;
- 5 Xaa at position 93 is Thr, Asp, Ser, Asn, Pro, Ala, Leu, or Arg;
- Xaa at position 94 is Arg, Ile, Ser, Glu, Leu, Val, or Pro;
- Xaa at position 95 is His, Gln, Pro, Val, Leu, Thr or Tyr;
- 10 Xaa at position 96 is Pro, Lys, Tyr, Gly, Ile, or Thr;
- Xaa at position 97 is Ile, Lys, Ala, or Asn;
- Xaa at position 98 is His, Ile, Asn, Leu, Asp, Ala, Thr, or Pro;
- Xaa at position 99 is Ile, Arg, Asp, Pro, Gln, Gly, Phe, or His;
- 15 Xaa at position 100 is Lys, Tyr, Leu, His, Ile, Ser, Gln, or Pro;
- Xaa at position 101 is Asp, Pro, Met, Lys, His, Thr, Val, Tyr, or Gln;
- 20 Xaa at position 102 is Gly, Leu, Glu, Lys, Ser, Tyr, or Pro;
- Xaa at position 103 is Asp, or Ser;
- Xaa at position 104 is Trp, Val, Cys, Tyr, Thr, Met, Pro, Leu, Gln, Lys, Ala, Phe, or Gly;
- 25 Xaa at position 105 is Asn, Pro, Ala, Phe, Ser, Trp, Gln, Tyr, Leu, Lys, Ile, or His;
- Xaa at position 106 is Glu, Ser, Ala, Lys, Thr, Ile, Gly, or Pro;
- Xaa at position 108 is Arg, Asp, Leu, Thr, Ile, or Pro;
- 30 Xaa at position 109 is Arg, Thr, Pro, Glu, Tyr, Leu, Ser, or Gly.

22. The method of claim 19 wherein said human interleukin-3 mutant polypeptide is of the Formula:

1	5	10
(Met) _m -Ala	Pro Met Thr Gln Thr Thr Ser Leu Lys Thr	
15	20	
Ser Trp Val Asn Cys Ser Xaa Xaa Xaa Asp Glu Ile Ile		
25	30	35
Xaa His Leu Lys Xaa Pro Pro Xaa Pro Xaa Leu Asp Xaa		
40	45	50
Xaa Asn Leu Asn Xaa Glu Asp Xaa Asp Ile Leu Xaa Glu		
55	60	
Xaa Asn Leu Arg Xaa Xaa Asn Leu Xaa Xaa Phe Xaa Xaa		
65	70	75
Ala Xaa Lys Xaa Leu Xaa Asn Ala Ser Xaa Ile Glu Xaa		
80	85	
Ile Leu Xaa Asn Leu Xaa Pro Cys Xaa Pro Xaa Xaa Thr		
90	95	100
Ala Xaa Pro Xaa Arg Xaa Pro Ile Xaa Ile Xaa Xaa Gly		
105	110	115
Asp Trp Xaa Glu Phe Arg Xaa Lys Leu Xaa Phe Tyr Leu		
120	125	
Xaa Xaa Leu Glu Xaa Ala Gln Xaa Gln Gln Thr Thr Leu		
130		
Ser Leu Ala Ile Phe [SEQ ID NO:7]		

wherein m is 0 or 1; Xaa at position 18 is Asn or Ile; Xaa at position 19 is Met, Ala or Ile; Xaa at position 20 is Ile, Pro or Ile; Xaa at position 23 is Ile, Ala or Leu; Xaa at position 25 is Thr or His; Xaa at position 29 is Gln, Arg, Val or Ile; Xaa at position 32 is Leu, Ala, Asn or Arg; Xaa at position 34 is Leu or Ser; Xaa at position 37 is Phe, Pro, or Ser; Xaa at position 38 is Asn or Ala; Xaa at position 42 is Gly, Ala, Ser, Asp or Asn; Xaa at position 45 is Gln, Val, or Met; Xaa at position 46 is Asp or Ser; Xaa at position 49 is Met, Ile, Leu or Asp; Xaa at

wherein m is 0 or 1; Xaa at position 18 is Asn or Ile; Xaa at position 19 is Met, Ala or Ile; Xaa at position 20 is Ile, Pro or Ile; Xaa at position 23 is Ile, Ala or Leu; Xaa at position 25 is Thr or His; Xaa at position 29 is Gln, Arg, Val or Ile; Xaa at position 32 is Leu, Ala, Asn or Arg; Xaa at position 34 is Leu or Ser; Xaa at position 37 is Phe, Pro, or Ser; Xaa at position 38 is Asn or Ala; Xaa at position 42 is Gly, Ala, Ser, Asp or Asn; Xaa at position 45 is Gln, Val, or Met; Xaa at position 46 is Asp or Ser; Xaa at position 49 is Met, Ile, Leu or Asp; Xaa at

wherein m is 0 or 1; Xaa at position 18 is Asn or Ile; Xaa at position 19 is Met, Ala or Ile; Xaa at position 20 is Ile, Pro or Ile; Xaa at position 23 is Ile, Ala or Leu; Xaa at position 25 is Thr or His; Xaa at position 29 is Gln, Arg, Val or Ile; Xaa at position 32 is Leu, Ala, Asn or Arg; Xaa at position 34 is Leu or Ser; Xaa at position 37 is Phe, Pro, or Ser; Xaa at position 38 is Asn or Ala; Xaa at position 42 is Gly, Ala, Ser, Asp or Asn; Xaa at position 45 is Gln, Val, or Met; Xaa at position 46 is Asp or Ser; Xaa at position 49 is Met, Ile, Leu or Asp; Xaa at

position 50 is Glu or Asp; Xaa at position 51 is Asn Arg or Ser; Xaa at position 55 is Arg, Leu, or Thr; Xaa at position 56 is Pro or Ser; Xaa at position 59 is Glu or Leu; Xaa at position 60 is Ala or Ser; Xaa at position 62 is Asn, Val or Pro; Xaa at position 63 is Arg or His; Xaa at position 65 is Val or Ser; Xaa at position 67 is Ser, Asn, His or Gln; Xaa at position 69 is Gln or Glu; Xaa at position 73 is Ala or Gly; Xaa at position 76 is Ser, Ala or Pro; Xaa at position 79 is Lys, Arg or Ser; Xaa at position 82 is Leu, Glu, Val or Trp; Xaa at position 85 is Leu or Val; Xaa at position 87 is Leu, Ser, Tyr; Xaa at position 88 is Ala or Trp; Xaa at position 91 is Ala or Pro; Xaa at position 93 is Pro or Ser; Xaa at position 95 is His or Thr; Xaa at position 98 is His, Ile, or Thr; Xaa at position 100 is Lys or Arg; Xaa at position 101 is Asp, Ala or Met; Xaa at position 105 is Asn or Glu; Xaa at position 109 is Arg, Glu or Leu; Xaa at position 112 is Thr or Gln; Xaa at position 116 is Lys, Val, Trp or Ser; Xaa at position 117 is Thr or Ser; Xaa at position 120 is Asn, Gln, or His; Xaa at position 123 is Ala or Glu; with the proviso that from four to forty-four of the amino acids designated by Xaa are different from the corresponding amino acids of native human interleukin-3.

23. The method of claim 21 wherein said human interleukin-3 mutant polypeptide is of the Formula:

	1		5		10
	(Met _m -Ala _n) _p -Asn	Cys	Ser	Xaa Xaa Xaa Asp	Glu Xaa Ile
30	15		20		
	Xaa His Leu Lys Xaa Pro Pro Xaa Pro Xaa Leu Asp Xaa				
	25		30		35
	Xaa Asn Leu Asn Xaa Glu Asp Xaa Xaa Ile Leu Xaa Glu				

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40 45
 Xaa Asn Leu Arg Xaa Xaa Asn Leu Xaa Xaa Phe Xaa Xaa
 50 55 60
 Ala Xaa Lys Xaa Leu Xaa Asn Ala Ser Xaa Ile Glu Xaa
 5 65 70 75
 Ile Leu Xaa Asn Xaa Xaa Pro Cys Xaa Pro Xaa Ala Thr
 80 85
 Ala Xaa Pro Xaa Arg Xaa Pro Ile Xaa Ile Xaa Xaa Gly
 90 95 100
 10 Asp Trp Xaa Glu Phe Arg Xaa Lys Leu Xaa Phe Tyr Leu
 105 110
 Xaa Xaa Leu Glu Xaa Ala Gln Xaa Gln Gln [SEQ ID NO:8]

wherein m is 0 or 1; n is 0 or 1; p is 0 or 1; Xaa at
 15 position 4 is Asn or Ile; Xaa at position 5 is Met, Ala or
 Ile; Xaa at position 6 is Ile, Pro or Leu; Xaa at position
 9 is Ile, Ala or Leu; Xaa at position 11 is Thr or His; Xaa
 at position 15 is Gln, Arg, Val or Ile; Xaa at position 18
 is Leu, Ala, Asn or Arg; Xaa at position 20 is Leu or Ser;
 20 Xaa at position 23 is Phe, Pro, or Ser; Xaa at position 24
 is Asn or Ala; Xaa at position 28 is Gly, Ala, Ser, Asp or
 Asn; Xaa at position 31 is Gln, Val, or Met; Xaa at
 position 32 is Asp or Ser; Xaa at position 35 is Met, Ile
 or Asp; Xaa at position 36 is Glu or Asp; Xaa at position
 25 37 is Asn, Arg or Ser; Xaa at position 41 is Arg, Leu, or
 Thr; Xaa at position 42 is Pro or Ser; Xaa at position 45
 is Glu or Leu; Xaa at position 46 is Ala or Ser; Xaa at
 position 48 is Asn, Val or Pro; Xaa at position 49 is Arg
 or His; Xaa at position 51 is Val or Ser; Xaa at position
 30 53 is Ser, Asn, His or Gln; Xaa at position 55 is Gln or
 Glu; Xaa at position 59 is Ala or Gly; Xaa at position 62
 is Ser, Ala or Pro; Xaa at position 65 is Lys, Arg or Ser;
 Xaa at position 67 is Leu, Glu, or Val; Xaa at position 68
 is Leu, Glu, Val or Trp; Xaa at position 71 is Leu or Val;
 35 Xaa at position 73 is Leu, Ser or Tyr; Xaa at position 74
 is Ala or Trp; Xaa at position 77 is Ala or Pro; Xaa at

position 79 is Pro or Ser; Xaa at position 81 is His or Thr; Xaa at position 84 is His, Ile, or Thr; Xaa at position 86 is Lys or Arg; Xaa at position 87 is Asp, Ala or Met; Xaa at position 91 is Asn or Glu; Xaa at position 95 is Arg, Glu, Leu; Xaa at position 98 Thr or Gln; Xaa at position 102 is Lys, Val, Trp or Ser; Xaa at position 103 is Thr or Ser; Xaa at position 106 is Asn, Gln, or His; Xaa at position 109 is Ala or Glu; with the proviso that from four to forty-four of the amino acids designated by Xaa are different from the corresponding amino acids of native (15-125)human interleukin-3.

24. The method of claim 22 wherein said human interleukin-3 mutant polypeptide is of the Formula:

Asn Cys Ser Ile Met Ile Asp Glu Ile Ile His His Leu
Lys Arg Pro Pro Ala Pro Leu Leu Asp Pro Asn Asn Leu Asn Ala
Glu Asp Val Asp Ile Leu Met Glu Asn Asn Leu Arg Arg Pro Asn
Leu Glu Ala Phe Asn Arg Ala Val Lys Ser Leu Gln Asn Ala Ser
Ala Ile Glu Ser Ile Leu Lys Asn Leu Leu Pro Cys Leu Pro Leu
Ala Thr Ala Ala Pro Thr Arg His Pro Ile His Ile Lys Asp Gly
Asp Trp Asn Glu Phe Arg Arg Lys Leu Thr Phe Tyr Leu Lys Thr
Leu Glu Asn Ala Gln Ala Gln Gln [SEQ ID NO:9];

Asn Cys Ser Ile Met Ile Asp Glu Ile Ile His His Leu
Lys Arg Pro Pro Asn Pro Leu Leu Asp Pro Asn Asn Leu Asn Ser
Glu Asp Met Asp Ile Leu Met Glu Asn Asn Leu Arg Arg Pro Asn
Leu Glu Ala Phe Asn Arg Ala Val Lys Ser Leu Gln Asn Ala Ser
Ala Ile Glu Ser Ile Leu Lys Asn Leu Leu Pro Cys Leu Pro Leu
Ala Thr Ala Ala Pro Thr Arg His Pro Ile His Ile Lys Asp Gly
Asp Trp Asn Glu Phe Arg Arg Lys Leu Thr Phe Tyr Leu Lys Thr
Leu Glu Asn Ala Gln Ala Gln Gln [SEQ ID NO:10];

Asn Cys Ser Ile Met Ile Asp Glu Ile Ile His His Leu
Lys Val Pro Pro Ala Pro Leu Leu Asp Ser Asn Asn Leu Asn Ser
Glu Asp Met Asp Ile Leu Met Glu Asn Asn Leu Arg Arg Pro Asn

Leu Glu Ala Phe Asn Arg Ala Val Lys Ser Leu Gln Asn Ala Ser
Ala
Ile Glu Ser Ile Leu Lys Asn Leu Leu Pro Cys Leu Pro Leu Ala
Thr Ala Ala Pro Thr Arg His Pro Ile His Ile Lys Asp Gly Asp
5 Trp Asn Glu Phe Arg Arg Lys Leu Thr Phe Tyr Leu Lys Thr Leu
Glu Asn Ala Gln Ala Gln Gln [SEQ ID NO:11];

Asn Cys Ser Asn Met Ile Asp Glu Ile Ile Thr His Leu
Lys Gln Pro Pro Leu Pro Leu Leu Asp Phe Asn Asn Leu Asn Gly
10 Glu Asp Gln Asp Ile Leu Met Glu Arg Asn Leu Arg Leu Pro Asn
Leu Leu Ala Phe Val Arg Ala Val Lys Asn Leu Glu Asn Ala Ser
Ala Ile Glu Ser Ile Leu Lys Asn Leu Leu Pro Cys Leu Pro Leu
Ala Thr Ala Ala Pro Thr Arg His Pro Ile His Ile Lys Asp Gly
Asp Trp Asn Glu Phe Arg Arg Lys Leu Thr Phe Tyr Leu Lys Thr
15 Leu Glu Asn Ala Gln Ala Gln Gln [SEQ ID NO:12];

Asn Cys Ser Asn Met Ile Asp Glu Ile Ile Thr His Leu
Lys Gln Pro Pro Leu Pro Leu Leu Asp Phe Asn Asn Leu Asn Gly
Glu Asp Gln Asp Ile Leu Met Glu Arg Asn Leu Arg Leu Pro Asn
20 Leu Glu Ser Phe Val Arg Ala Val Lys Asn Leu Glu Asn Ala Ser
Ala Ile Glu Ser Ile Leu Lys Asn Leu Leu Pro Cys Leu Pro Leu
Ala Thr Ala Ala Pro Thr Arg His Pro Ile His Ile Lys Asp Gly
Asp Trp Asn Glu Phe Arg Arg Lys Leu Thr Phe Tyr Leu Lys Thr
Leu Glu Asn Ala Gln Ala Gln Gln [SEQ ID NO:13];

25 Asn Cys Ser Asn Met Ile Asp Glu Ile Ile Thr His Leu
Lys Gln Pro Pro Leu Pro Leu Leu Asp Phe Asn Asn Leu Asn Gly
Glu Asp Gln Asp Ile Leu Met Glu Arg Asn Leu Arg Thr Pro Asn
Leu Leu Ala Phe Val Arg Ala Val Lys His Leu Glu Asn Ala Ser
30 Ala Ile Glu Ser Ile Leu Lys Asn Leu Leu Pro Cys Leu Pro Leu
Ala Thr Ala Ala Pro Thr Arg His Pro Ile His Ile Lys Asp Gly
Asp Trp Asn Glu Phe Arg Arg Lys Leu Thr Phe Tyr Leu Lys Thr
Leu Glu Asn Ala Gln Ala Gln Gln [SEQ ID NO:14];

35 Asn Cys Ser Asn Met Ile Asp Glu Ile Ile Thr His Leu
Lys Gln Pro Pro Leu Pro Leu Leu Asp Phe Asn Asn Leu Asn Gly

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Glu Asp Gln Asp Ile Leu Met Glu Asn Asn Leu Arg Arg Pro Asn
Leu Glu Ala Phe Asn Arg Ala Val Lys Ser Leu Gln Asn Ala Ser
Gly Ile Glu Ala Ile Leu Arg Asn Leu Gln Pro Cys Leu Pro Ser
Ala Thr Ala Ala Pro Ser Arg His Pro Ile Ile Ile Lys Ala Gly
5 Asp Trp Gln Glu Phe Arg Arg Lys Leu Thr Phe Tyr Leu Lys Thr
Leu Glu Asn Ala Gln Ala Gln Gln [SEQ ID NO:15];

Asn Cys Ser Asn Met Ile Asp Glu Ile Ile Thr His Leu
Lys Gln Pro Pro Leu Pro Leu Leu Asp Phe Asn Asn Leu Asn Gly
10 Glu Asp Gln Asp Ile Leu Met Glu Asn Asn Leu Arg Arg Pro Asn
Leu Glu Ala Phe Asn Arg Ala Val Lys Ser Leu Gln Asn Ala Ser
Gly Ile Glu Ala Ile Leu Arg Asn Leu Val Pro Cys Leu Pro Ser
Ala Thr Ala Ala Pro Ser Arg His Pro Ile Thr Ile Lys Ala Gly
Asp Trp Gln Glu Phe Arg Arg Lys Leu Thr Phe Tyr Leu Lys Thr
15 Leu Glu Asn Ala Gln Ala Gln Gln [SEQ ID NO:16];

Asn Cys Ser Asn Met Ile Asp Glu Ile Ile Thr His Leu
Lys Gln Pro Pro Leu Pro Leu Leu Asp Phe Asn Asn Leu Asn Gly
Glu Asp Gln Asp Ile Leu Met Glu Asn Asn Leu Arg Arg Pro Asn
20 Leu Glu Ala Phe Asn Arg Ala Val Lys Ser Leu Gln Asn Ala Ser
Ala Ile Glu Ser Ile Leu Lys Asn Leu Leu Pro Cys Leu Pro Leu
Ala Thr Ala Ala Pro Thr Arg His Pro Ile His Ile Lys Asp Gly
Asp Trp Asn Glu Phe Arg Glu Lys Leu Thr Phe Tyr Leu Val Thr
Leu Glu Gln Ala Gln Glu Gln Gln [SEQ ID NO:17];

25 Asn Cys Ser Asn Met Ile Asp Glu Ile Ile Thr His Leu
Lys Gln Pro Pro Leu Pro Leu Leu Asp Phe Asn Asn Leu Asn Gly
Glu Asp Gln Asp Ile Leu Met Glu Asn Asn Leu Arg Arg Pro Asn
Leu Glu Ala Phe Asn Arg Ala Val Lys Ser Leu Gln Asn Ala Ser
30 Ala
Ile Glu Ser Ile Leu Lys Asn Leu Leu Pro Cys Leu Pro Leu Ala
Thr Ala Ala Pro Thr Arg His Pro Ile His Ile Lys Asp Gly Asp
Trp Asn Glu Phe Arg Glu Lys Leu Thr Phe Tyr Leu Val Ser Leu
Glu His Ala Gln Glu Gln Gln [SEQ ID NO:18];

35 Asn Cys Ser Asn Met Ile Asp Glu Ile Ile Thr His Leu

Lys Gln Pro Pro Leu Pro Leu Leu Asp Phe Asn Asn Leu Asn Gly
Glu Asp Gln Asp Ile Leu Met Glu Asn Asn Leu Arg Arg Pro Asn
Leu Glu Ala Phe Asn Arg Ala Val Lys Ser Leu Gln Asn Ala Ser
Gly Ile Glu Ala Ile Leu Arg Asn Leu Gln Pro Cys Leu Pro Ser
5 Ala Thr Ala Ala Pro Ser Arg His Pro Ile Ile Ile Lys Ala Gly
Asp Trp Gln Glu Phe Arg Glu Lys Leu Thr Phe Tyr Leu Val Thr
Leu Glu Gln Ala Gln Glu Gln Gln [SEQ ID NO:19];

Asn Cys Ser Asn Met Ile Asp Glu Ile Ile Thr His Leu
10 Lys Gln Pro Pro Leu Pro Leu Leu Asp Phe Asn Asn Leu Asn Gly
Glu Asp Gln Asp Ile Leu Met Glu Asn Asn Leu Arg Arg Pro Asn
Leu Glu Ala Phe Asn Arg Ala Val Lys Ser Leu Gln Asn Ala Ser
Gly Ile Glu Ala Ile Leu Arg Asn Leu Val Pro Cys Leu Pro Ser
Ala Thr Ala Ala Pro Ser Arg His Pro Ile Thr Ile Lys Ala Gly
15 Asp Trp Gln Glu Phe Arg Glu Lys Leu Thr Phe Tyr Leu Val Thr
Leu Glu Gln Ala Gln Glu Gln Gln [SEQ ID NO:20];

Asn Cys Ser Asn Met Ile Asp Glu Ile Ile Thr His Leu
Lys Gln Pro Pro Leu Pro Leu Leu Asp Phe Asn Asn Leu Asn Gly
20 Glu Asp Gln Asp Ile Leu Met Glu Asn Asn Leu Arg Arg Pro Asn
Leu Glu Ala Phe Asn Arg Ala Val Lys Ser Leu Gln Asn Ala Ser
Gly Ile Glu Ala Ile Leu Arg Asn Leu Val Pro Cys Leu Pro Ser
Ala Thr Ala Ala Pro Ser Arg His Pro Ile Thr Ile Lys Ala Gly
Asp Trp Gln Glu Phe Arg Glu Lys Leu Thr Phe Tyr Leu Val Ser
25 Leu Glu His Ala Gln Glu Gln Gln [SEQ ID NO:21];

Asn Cys Ser Ile Met Ile Asp Glu Ile Ile His His Leu
Lys Arg Pro Pro Ala Pro Leu Leu Asp Pro Asn Asn Leu Asn Ala
Glu Asp Val Asp Ile Leu Met Glu Arg Asn Leu Arg Leu Pro Asn
30 Leu Glu Ser Phe Val Arg Ala Val Lys Asn Leu Glu Asn Ala Ser
Ala Ile Glu Ser Ile Leu Lys Asn Leu Leu Pro Cys Leu Pro Leu
Ala Thr Ala Ala Pro Thr Arg His Pro Ile His Ile Lys Asp Gly
Asp Trp Asn Glu Phe Arg Arg Lys Leu Thr Phe Tyr Leu Lys Thr
Leu Glu Asn Ala Gln Ala Gln Gln [SEQ ID NO:22];

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Asn Cys Ser Ile Met Ile Asp Glu Ile Ile His His Leu

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Lys Arg Pro Pro Asn Pro Leu Leu Asp Pro Asn Asn Leu Asn Ser
Glu Asp Met Asp Ile Leu Met Glu Arg Asn Leu Arg Thr Pro Asn
Leu Leu Ala Phe Val Arg Ala Val Lys His Leu Glu Asn Ala Ser
Ala Ile Glu Ser Ile Leu Lys Asn Leu Leu Pro Cys Leu Pro Leu
5 Ala Thr Ala Ala Pro Thr Arg His Pro Ile His Ile Lys Asp Gly
Asp Trp Asn Glu Phe Arg Arg Lys Leu Thr Phe Tyr Leu Lys Thr
Leu Glu Asn Ala Gln Ala Gln Gln [SEQ ID NO:23];

Asn Cys Ser Ile Met Ile Asp Glu Ile Ile His His Leu
10 Lys Val Pro Pro Ala Pro Leu Leu Asp Ser Asn Asn Leu Asn Ser
Glu Asp Met Asp Ile Leu Met Glu Arg Asn Leu Arg Leu Pro Asn
Leu Leu Ala Phe Val Arg Ala Val Lys Asn Leu Glu Asn Ala Ser
Ala Ile Glu Ser Ile Leu Lys Asn Leu Leu Pro Cys Leu Pro Leu
Ala Thr Ala Ala Pro Thr Arg His Pro Ile His Ile Lys Asp Gly
15 Asp Trp Asn Glu Phe Arg Arg Lys Leu Thr Phe Tyr Leu Lys Thr
Leu Glu Asn Ala Gln Ala Gln Gln [SEQ ID NO:24];

Met Ala Asn Cys Ser Asn Met Ile Asp Glu Ile Ile Thr His Leu
Lys Gln Pro Pro Leu Pro Leu Leu Asp Phe Asn Asn Leu Asn Gly
20 Glu Asp Gln Asp Ile Leu Met Glu Asn Asn Leu Arg Arg Pro Asn
Leu Glu Ala Phe Asn Arg Ala Val Lys Ser Leu Gln Asn Ala Ser
Gly Ile Glu Ala Ile Leu Arg Asn Leu Gln Pro Cys Leu Pro Ser
Ala Thr Ala Ala Pro Ser Arg His Pro Ile Ile Ile Lys Ala Gly
Asp Trp Gln Glu Phe Arg Glu Lys Leu Thr Phe Tyr Leu Val Thr
25 Leu Glu Gln Ala Gln Glu Gln Gln [SEQ ID NO:25];

Met Ala Asn Cys Ser Asn Met Ile Asp Glu Ile Ile Thr His Leu
Lys Gln Pro Pro Leu Pro Leu Leu Asp Phe Asn Asn Leu Asn Gly
Glu Asp Gln Asp Ile Leu Met Glu Asn Asn Leu Arg Arg Pro Asn
30 Leu Glu Ala Phe Asn Arg Ala Val Lys Ser Leu Gln Asn Ala Ser
Gly Ile Glu Ala Ile Leu Arg Asn Leu Val Pro Cys Leu Pro Ser
Ala Thr Ala Ala Pro Ser Arg His Pro Ile Thr Ile Lys Ala Gly
Asp Trp Gln Glu Phe Arg Glu Lys Leu Thr Phe Tyr Leu Val Thr
Leu Glu Gln Ala Gln Glu Gln Gln [SEQ ID NO:26];

35

Met Ala Asn Cys Ser Asn Met Ile Asp Glu Ile Ile Thr His Leu

Lys Gln Pro Pro Leu Pro Leu Leu Asp Phe Asn Asn Leu Asn Gly
Glu Asp Gln Asp Ile Leu Met Glu Asn Asn Leu Arg Arg Pro Asn
Leu Glu Ala Phe Asn Arg Ala Val Lys Ser Leu Gln Asn Ala Ser
Gly Ile Glu Ala Ile Leu Arg Asn Leu Val Pro Cys Leu Pro Ser
5 Ala Thr Ala Ala Pro Ser Arg His Pro Ile Thr Ile Lys Ala Gly
Asp Trp Gln Glu Phe Arg Glu Lys Leu Thr Phe Tyr Leu Val Ser
Leu Glu His Ala Gln Glu Gln Gln [SEQ ID NO:27];

Met Ala Asn Cys Ser Ile Met Ile Asp Glu Ile Ile His His Leu
10 Lys Arg Pro Pro Ala Pro Leu Leu Asp Pro Asn Asn Leu Asn Ala
Glu Asp Val Asp Ile Leu Met Glu Arg Asn Leu Arg Leu Pro Asn
Leu Glu Ser Phe Val Arg Ala Val Lys Asn Leu Glu Asn Ala Ser
Ala Ile Glu Ser Ile Leu Lys Asn Leu Leu Pro Cys Leu Pro Leu
Ala Thr Ala Ala Pro Thr Arg His Pro Ile His Ile Lys Asp Gly
15 Asp Trp Asn Glu Phe Arg Arg Lys Leu Thr Phe Tyr Leu Lys Thr
Leu Glu Asn Ala Gln Ala Gln Gln [SEQ ID NO:28];

Met Ala Asn Cys Ser Ile Met Ile Asp Glu Ile Ile His His Leu
Lys Arg Pro Pro Asn Pro Leu Leu Asp Pro Asn Asn Leu Asn Ser
20 Glu Asp Met Asp Ile Leu Met Glu Arg Asn Leu Arg Thr Pro Asn
Leu Leu Ala Phe Val Arg Ala Val Lys His Leu Glu Asn Ala Ser
Ala Ile Glu Ser Ile Leu Lys Asn Leu Leu Pro Cys Leu Pro Leu
Ala Thr Ala Ala Pro Thr Arg His Pro Ile His Ile Lys Asp Gly
Asp Trp Asn Glu Phe Arg Arg Lys Leu Thr Phe Tyr Leu Lys Thr
25 Leu Glu Asn Ala Gln Ala Gln Gln [SEQ ID NO:29];

Met Ala Asn Cys Ser Ile Met Ile Asp Glu Ile Ile His His Leu
Lys Val Pro Pro Ala Pro Leu Leu Asp Ser Asn Asn Leu Asn Ser
Glu Asp Met Asp Ile Leu Met Glu Arg Asn Leu Arg Leu Pro Asn
30 Leu Leu Ala Phe Val Arg Ala Val Lys Asn Leu Glu Asn Ala Ser
Ala Ile Glu Ser Ile Leu Lys Asn Leu Leu Pro Cys Leu Pro Leu
Ala Thr Ala Ala Pro Thr Arg His Pro Ile His Ile Lys Asp Gly
Asp Trp Asn Glu Phe Arg Arg Lys Leu Thr Phe Tyr Leu Lys Thr
Leu Glu Asn Ala Gln Ala Gln Gln [SEQ ID NO:30];

35 Met Ala Asn Cys Ser Ile Met Ile Asp Glu Ile Ile His His Leu

Lys Arg Pro Pro Ala Pro Leu Leu Asp Pro Asn Asn Leu Asn Ala
Glu Asp Val Asp Ile Leu Met Glu Arg Asn Leu Arg Leu Pro Asn
Leu Glu Ser Phe Val Arg Ala Val Lys Asn Leu Glu Asn Ala Ser
Gly Ile Glu Ala Ile Leu Arg Asn Leu Gln Pro Cys Leu Pro Ser
5 Ala Thr Ala Ala Pro Ser Arg His Pro Ile Ile Ile Lys Ala Gly
Asp Trp Gln Glu Phe Arg Glu Lys Leu Thr Phe Tyr Leu Val Thr
Leu Glu Gln Ala Gln Glu Gln Gln [SEQ ID NO:31];

Met Ala Asn Cys Ser Ile Met Ile Asp Glu Ile Ile His His Leu
10 Lys Arg Pro Pro Asn Pro Leu Leu Asp Pro Asn Asn Leu Asn Ser
Glu Asp Met Asp Ile Leu Met Glu Arg Asn Leu Arg Thr Pro Asn
Leu Leu Ala Phe Val Arg Ala Val Lys His Leu Glu Asn Ala Ser
Gly Ile Glu Ala Ile Leu Arg Asn Leu Gln Pro Cys Leu Pro Ser
Ala Thr Ala Ala Pro Ser Arg His Pro Ile Ile Ile Lys Ala Gly
15 Asp Trp Gln Glu Phe Arg Glu Lys Leu Thr Phe Tyr Leu Val Thr
Leu Glu Gln Ala Gln Glu Gln Gln [SEQ ID NO:32];

Met Ala Asn Cys Ser Ile Met Ile Asp Glu Ile Ile His His Leu
Lys Val Pro Pro Ala Pro Leu Leu Asp Ser Asn Asn Leu Asn Ser
20 Glu Asp Met Asp Ile Leu Met Glu Arg Asn Leu Arg Leu Pro Asn
Leu Leu Ala Phe Val Arg Ala Val Lys Asn Leu Glu Asn Ala Ser
Gly Ile Glu Ala Ile Leu Arg Asn Leu Gln Pro Cys Leu Pro Ser
Ala Thr Ala Ala Pro Ser Arg His Pro Ile Ile Ile Lys Ala Gly
Asp Trp Gln Glu Phe Arg Glu Lys Leu Thr Phe Tyr Leu Val Thr
25 Leu Glu Gln Ala Gln Glu Gln Gln [SEQ ID NO:33];

Met Ala Asn Cys Ser Ile Met Ile Asp Glu Ile Ile His His Leu
Lys Arg Pro Pro Ala Pro Leu Leu Asp Pro Asn Asn Leu Asn Ala
Glu Asp Val Asp Ile Leu Met Glu Arg Asn Leu Arg Leu Pro Asn
30 Leu Glu Ser Phe Val Arg Ala Val Lys Asn Leu Glu Asn Ala Ser
Gly Ile Glu Ala Ile Leu Arg Asn Leu Val Pro Cys Leu Pro Ser
Ala Thr Ala Ala Pro Ser Arg His Pro Ile Thr Ile Lys Ala Gly
Asp Trp Gln Glu Phe Arg Glu Lys Leu Thr Phe Tyr Leu Val Thr
Leu Glu Gln Ala Gln Glu Gln Gln [SEQ ID NO:34];

35 Met Ala Asn Cys Ser Ile Met Ile Asp Glu Ile Ile His His Leu

Lys Val Pro Pro Ala Pro Leu Leu Asp Ser Asn Asn Leu Asn Ser
Glu Asp Met Asp Ile Leu Met Glu Arg Asn Leu Arg Leu Pro Asn
Leu Leu Ala Phe Val Arg Ala Val Lys Asn Leu Glu Asn Ala Ser
Gly Ile Glu Ala Ile Leu Arg Asn Leu Val Pro Cys Leu Pro Ser
5 Ala Thr Ala Ala Pro Ser Arg His Pro Ile Thr Ile Lys Ala Gly
Asp Trp Gln Glu Phe Arg Glu Lys Leu Thr Phe Tyr Leu Val Thr
Leu Glu Gln Ala Gln Glu Gln Gln [SEQ ID NO:35];

Met Ala Asn Cys Ser Ile Met Ile Asp Glu Ile Ile His His Leu
10 Lys Arg Pro Pro Asn Pro Leu Leu Asp Pro Asn Asn Leu Asn Ser
Glu Asp Met Asp Ile Leu Met Glu Arg Asn Leu Arg Thr Pro Asn
Leu Leu Ala Phe Val Arg Ala Val Lys His Leu Glu Asn Ala Ser
Gly Ile Glu Ala Ile Leu Arg Asn Leu Val Pro Cys Leu Pro Ser
Ala Thr Ala Ala Pro Ser Arg His Pro Ile Thr Ile Lys Ala Gly
15 Asp Trp Gln Glu Phe Arg Glu Lys Leu Thr Phe Tyr Leu Val Ser
Leu Glu His Ala Gln Glu Gln Gln [SEQ ID NO:36];

Met Ala Asn Cys Ser Ile Met Ile Asp Glu Ile Ile His His Leu
Lys Val Pro Pro Ala Pro Leu Leu Asp Ser Asn Asn Leu Asn Ser
20 Glu Asp Met Asp Ile Leu Met Glu Arg Asn Leu Arg Leu Pro Asn
Leu Leu Ala Phe Val Arg Ala Val Lys Asn Leu Glu Asn Ala Ser
Gly Ile Glu Ala Ile Leu Arg Asn Leu Val Pro Cys Leu Pro Ser
Ala Thr Ala Ala Pro Ser Arg His Pro Ile Thr Ile Lys Ala Gly
Asp Trp Gln Glu Phe Arg Glu Lys Leu Thr Phe Tyr Leu Val Ser
25 Leu Glu His Ala Gln Glu Gln Gln [SEQ ID NO:37];

Met Ala Asn Cys Ser Ile Met Ile Asp Glu Ile Ile His His Leu
Lys Arg Pro Pro Asn Pro Leu Leu Asp Pro Asn Asn Leu Asn Ser
Glu Asp Met Asp Ile Leu Met Glu Arg Asn Leu Arg Thr Pro Asn
30 Leu Leu Ala Phe Val Arg Ala Val Lys His Leu Glu Asn Ala Ser
Gly Ile Glu Ala Ile Leu Arg Asn Leu Val Pro Cys Leu Pro Ser
Ala Thr Ala Ala Pro Ser Arg His Pro Ile Thr Ile Lys Ala Gly
Asp Trp Gln Glu Phe Arg Glu Lys Leu Thr Phe Tyr Leu Val Thr
Leu Glu Gln Ala Gln Glu Gln Gln [SEQ ID NO:38];

35 Met Ala Asn Cys Ser Ile Met Ile Asp Glu Ile Ile His His Leu

Lys Arg Pro Pro Ala Pro Leu Leu Asp Pro Asn Asn Leu Asn Ala
Glu Asp Val Asp Ile Leu Met Glu Arg Asn Leu Arg Leu Pro Asn
Leu Glu Ser Phe Val Arg Ala Val Lys Asn Leu Glu Asn Ala Ser
Gly Ile Glu Ala Ile Leu Arg Asn Leu Val Pro Cys Leu Pro Ser
5 Ala Thr Ala Ala Pro Ser Arg His Pro Ile Thr Ile Lys Ala Gly
Asp Trp Gln Glu Phe Arg Glu Lys Leu Thr Phe Tyr Leu Val Ser
Leu Glu His Ala Gln Glu Gln Gln [SEQ ID NO:39].

10 Met Ala Asn Cys Ser Ile Met Ile Asp Glu Ile Ile His His Leu
Lys Arg Pro Pro Ala Pro Leu Leu Asp Pro Asn Asn Leu Asn Ala
Glu Asp Val Asp Ile Leu Met Asp Arg Asn Leu Arg Leu Ser Asn
Leu Glu Ser Phe Val Arg Ala Val Lys Asn Leu Glu Asn Ala Ser
Gly Ile Glu Ala Ile Leu Arg Asn Leu Gln Pro Cys Leu Pro Ser
15 Ala Thr Ala Ala Pro Ser Arg His Pro Ile Ile Ile Lys Ala Gly
Asp Trp Gln Glu Phe Arg Glu Lys Leu Thr Phe Tyr Leu Val Thr
Leu Glu Gln Ala Gln Glu Gln Gln [SEQ ID NO:40]

Met Ala Asn Cys Ser Ile Met Ile Asp Glu Ala Ile His His Leu
20 Lys Arg Pro Pro Ala Pro Ser Leu Asp Pro Asn Asn Leu Asn Asp
Glu Asp Met Ser Ile Leu Met Glu Arg Asn Leu Arg Leu Pro Asn
Leu Glu Ser Phe Val Arg Ala Val Lys Asn Leu Glu Asn Ala Ser
Gly Ile Glu Ala Ile Leu Arg Asn Leu Gln Pro Cys Leu Pro Ser
Ala Thr Ala Ala Pro Ser Arg His Pro Ile Ile Ile Lys Ala Gly
25 Asp Trp Gln Glu Phe Arg Glu Lys Leu Thr Phe Tyr Leu Val Thr
Leu Glu Gln Ala Gln Glu Gln Gln [SEQ ID NO:41]

Met Ala Asn Cys Ser Ile Met Ile Asp Glu Ile Ile His His Leu
Lys Arg Pro Pro Ala Pro Leu Leu Asp Pro Asn Asn Leu Asn Asp
30 Glu Asp Met Ser Ile Leu Met Glu Arg Asn Leu Arg Leu Pro Asn
Leu Glu Ser Phe Val Arg Ala Val Lys Asn Leu Glu Asn Ala Ser
Gly Ile Glu Ala Ile Leu Arg Asn Leu Gln Pro Cys Leu Pro Ser
Ala Thr Ala Ala Pro Ser Arg His Pro Ile Ile Ile Lys Ala Gly
Asp Trp Gln Glu Phe Arg Glu Lys Leu Thr Phe Tyr Leu Val Thr
35 Leu Glu Gln Ala Gln Glu Gln Gln [SEQ ID NO:42]

Met Ala Asn Cys Ser Ile Met Ile Asp Glu Ile Ile His His Leu
Lys Arg Pro Pro Ala Pro Leu Leu Asp Pro Asn Asn Leu Asn Ala

Glu Asp Val Asp Ile Leu Met Asp Arg Asn Leu Arg Leu Pro Asn
Leu Glu Ser Phe Val Arg Ala Val Lys Asn Leu Glu Asn Ala Ser
Gly Ile Glu Ala Ile Leu Arg Asn Leu Gln Pro Cys Leu Pro Ser
Ala Thr Ala Ala Pro Ser Arg His Pro Ile Ile Ile Lys Ala Gly
5 Asp Trp Gln Glu Phe Arg Glu Lys Leu Thr Phe Tyr Leu Val Thr
Leu Glu Gln Ala Gln Glu Gln Gln [SEQ ID NO:43]

Met Ala Asn Cys Ser Ile Met Ile Asp Glu Ile Ile His His Leu
10 Lys Arg Pro Pro Ala Pro Leu Leu Asp Pro Asn Asn Leu Asn Asp
Glu Asp Val Ser Ile Leu Met Glu Arg Asn Leu Arg Leu Pro Asn
Leu Glu Ser Phe Val Arg Ala Val Lys Asn Leu Glu Asn Ala Ser
Gly Ile Glu Ala Ile Leu Arg Asn Leu Gln Pro Cys Leu Pro Ser
Ala Thr Ala Ala Pro Ser Arg His Pro Ile Ile Ile Lys Ala Gly
15 Asp Trp Gln Glu Phe Arg Glu Lys Leu Thr Phe Tyr Leu Val Thr
Leu Glu Gln Ala Gln Glu Gln Gln [SEQ ID NO:44]

Met Ala Asn Cys Ser Ile Met Ile Asp Glu Ile Ile His His Leu
20 Lys Arg Pro Pro Ala Pro Leu Leu Asp Pro Asn Asn Leu Asn Asp
Glu Asp Met Ser Ile Leu Met Glu Arg Asn Leu Arg Leu Pro Asn
Leu Glu Ser Phe Val Arg Ala Val Lys Asn Leu Glu Asn Ala Ser
Gly Ile Glu Ala Ile Leu Arg Asn Leu Gln Pro Cys Leu Pro Ser
Ala Thr Ala Ala Pro Ser Arg His Pro Ile Ile Ile Lys Ala Gly
25 Asp Trp Gln Glu Phe Arg Glu Lys Leu Thr Phe Tyr Leu Val Thr
Leu Glu Gln Ala Gln Glu Gln Gln [SEQ ID NO:45]

Met Ala Tyr Pro Glu Thr Asp Tyr Lys Asp Asp Asp Lys Asn
Cys Ser Ile Met Ile Asp Glu Ile Ile His His Leu Lys Arg Pro
30 Pro Ala Pro Leu Leu Asp Pro Asn Asn Leu Asn Ala Glu Asp Val
Asp Ile Leu Met Glu Arg Asn Leu Arg Leu Pro Asn Leu Glu Ser
Phe Val Arg Ala Val Lys Asn Leu Glu Asn Ala Ser Gly Ile Glu
Ala Ile Leu Arg Asn Leu Gln Pro Cys Leu Pro Ser Ala Thr Ala
Ala Pro Ser Arg His Pro Ile Ile Ile Lys Ala Gly Asp Trp Gln
35 Glu Phe Arg Glu Lys Leu Thr Phe Tyr Leu Val Thr Leu Glu Gln
Ala Gln Glu Gln Gln [SEQ ID NO:46]

Met Ala Tyr Pro Glu Thr Asp Tyr Lys Asp Asp Asp Asp Lys Asn
Cys Ser Ile Met Ile Asp Glu Ile Ile His His Leu Lys Arg Pro
5 Pro Asn Pro Leu Leu Asp Pro Asn Asn Leu Asn Ser Glu Asp Met
Asp Ile Leu Met Glu Arg Asn Leu Arg Thr Pro Asn Leu Leu Ala
Phe Val Arg Ala Val Lys His Leu Glu Asn Ala Ser Gly Ile Glu
Ala Ile Leu Arg Asn Leu Gln Pro Cys Leu Pro Ser Ala Thr Ala
Ala Pro Ser Arg His Pro Ile Ile Ile Lys Ala Gly Asp Trp Gln
10 Glu Phe Arg Glu Lys Leu Thr Phe Tyr Leu Val Thr Leu Glu Gln
Ala Gln Glu Gln Gln [SEQ ID NO:47] and

Met Ala Asn Cys Ser Ile Met Ile Asp Glu Leu Ile His His Leu
Lys Ile Pro Pro Asn Pro Ser Leu Asp Ser Ala Asn Leu Asn Ser
15 Glu Asp Val Ser Ile Leu Met Glu Arg Asn Leu Arg Thr Pro Asn
Leu Leu Ala Phe Val Arg Ala Val Lys His Leu Glu Asn Ala Ser
Gly Ile Glu Ala Ile Leu Arg Asn Leu Gln Pro Cys Leu Pro Ser
Ala Thr Ala Ala Pro Ser Arg His Pro Ile Ile Ile Lys Ala Gly
Asp Trp Gln Glu Phe Arg Glu Lys Leu Thr Phe Tyr Leu Val Thr
20 Leu Glu Gln Ala Gln Glu Gln [SEQ ID NO:48].

25. The method of claim 23 wherein said human
interleukin-3 mutant polypeptide is of the Formula:

25 Met Ala Asn Cys Ser Ile Met Ile Asp Glu Ile Ile His His Leu
Lys Arg Pro Pro Asn Pro Leu Leu Asp Pro Asn Asn Leu Asn Ser
Glu Asp Met Asp Ile Leu Met Glu Arg Asn Leu Arg Thr Pro Asn
Leu Leu Ala Phe Val Arg Ala Val Lys His Leu Glu Asn Ala Ser
Gly Ile Glu Ala Ile Leu Arg Asn Leu Gln Pro Cys Leu Pro Ser
30 Ala Thr Ala Ala Pro Ser Arg His Pro Ile Ile Ile Lys Ala Gly
Asp Trp Gln Glu Phe Arg Glu Lys Leu Thr Phe Tyr Leu Val Thr
Leu Glu Gln Ala Gln Glu Gln [SEQ ID NO:32].

26. The method as recited in claim
35 14,15,16,17,18,19,20,21,22,23,24 or 25 wherein said colony
stimulating factor is selected from the group consisting of
GM-CSF, G-CSF, and Meg-CSF.